Florida WILDLIFE

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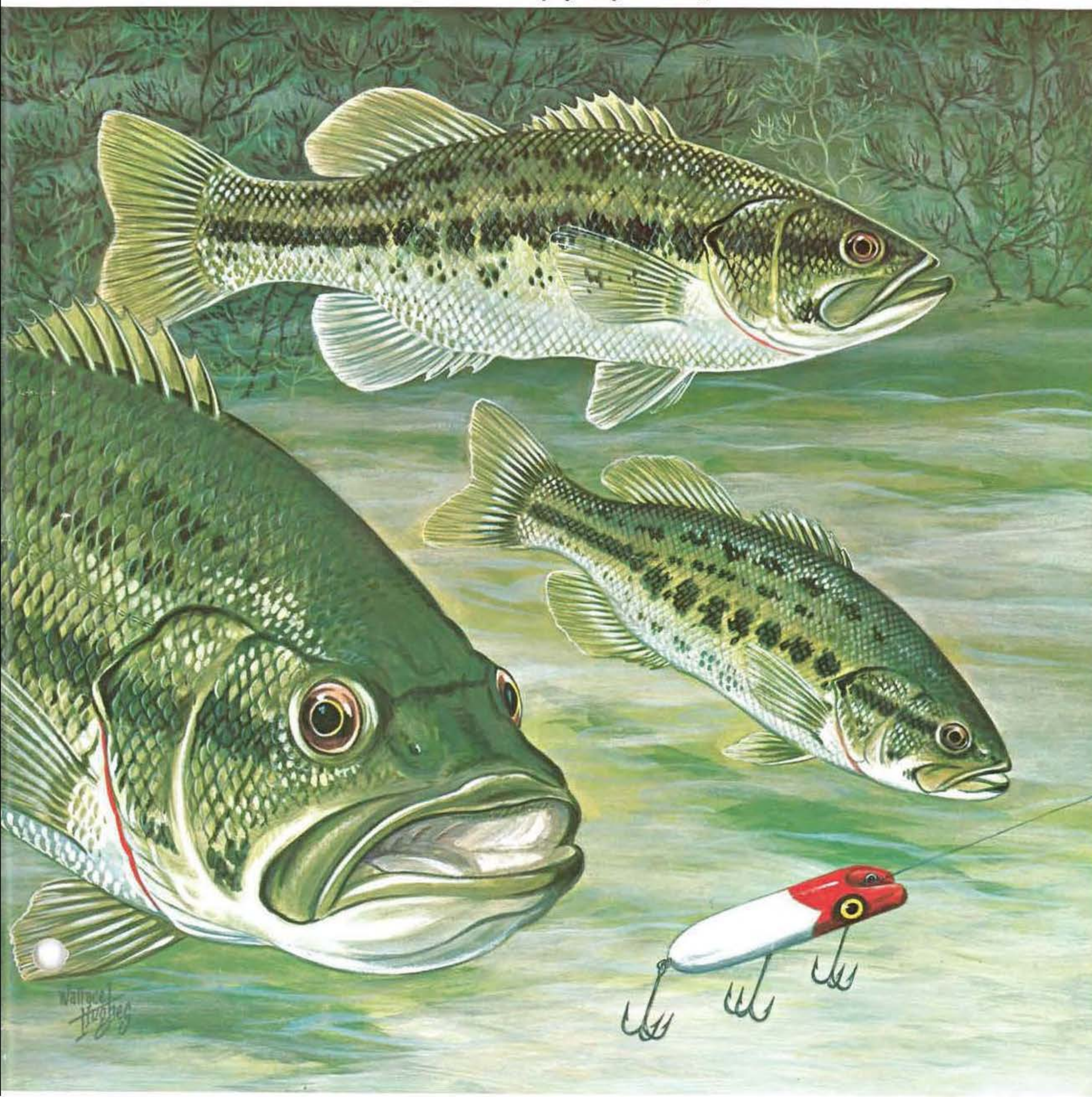
Outdoor Recreation

Lake Enrichment
Bobcat Bonanza

SEPTEMBER 1971

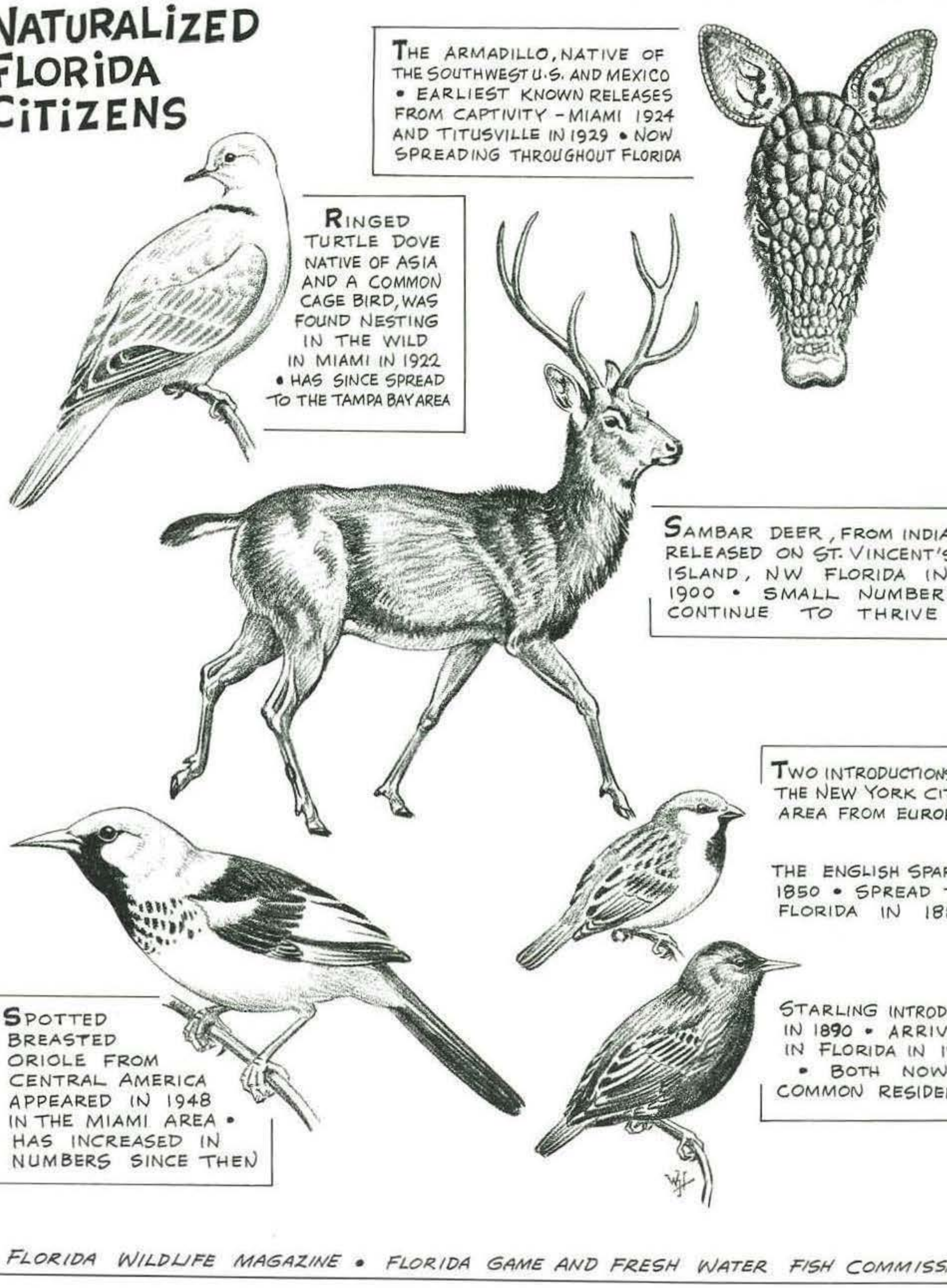
The Florida Magazine for all Sportsmen

25 CENTS



Florida Wildlife Scrapbook

NATURALIZED FLORIDA CITIZENS



THE ARMADILLO, NATIVE OF THE SOUTHWEST U.S. AND MEXICO • EARLIEST KNOWN RELEASES FROM CAPTIVITY – MIAMI 1924 AND TITUSVILLE IN 1929 • NOW SPREADING THROUGHOUT FLORIDA

RINGED TURTLE DOVE NATIVE OF ASIA AND A COMMON CAGE BIRD, WAS FOUND NESTING IN THE WILD IN MIAMI IN 1922 • HAS SINCE SPREAD TO THE TAMPA BAY AREA

SAMBAR DEER, FROM INDIA, RELEASED ON ST. VINCENT'S ISLAND, NW FLORIDA IN 1900 • SMALL NUMBER CONTINUE TO THRIVE

TWO INTRODUCTIONS IN THE NEW YORK CITY AREA FROM EUROPE –

THE ENGLISH SPARROW 1850 • SPREAD TO FLORIDA IN 1882

STARLING INTRODUCED IN 1890 • ARRIVED IN FLORIDA IN 1918 • BOTH NOW COMMON RESIDENTS

SPOTTED BREASTED ORIOLE FROM CENTRAL AMERICA APPEARED IN 1948 IN THE MIAMI AREA • HAS INCREASED IN NUMBERS SINCE THEN

FLORIDA WILDLIFE MAGAZINE • FLORIDA GAME AND FRESH WATER FISH COMMISSION

Florida WILDLIFE

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The Cover

Known for its large size and "bucket" mouth—and sought as the toughest of angling trophies down South—the Florida Largemouth Bass is now gaining fame as a heavier and harder-to-catch game fish—in California. See page 30.

From A Painting By Wallace Hughes

FLORIDA WILDLIFE is published monthly by the Florida Game and Fresh Water Fish Commission, Tallahassee, Fla. Single copy price, 25¢. Subscription rates: 1-year, $2.50; 2-year, $4.75; 3-year, $6.25. Change of address should be reported promptly. The Commission assumes no responsibility for unsolicited manuscripts and illustrative materials. Permission is granted to reprint text materials, EXCEPT for advertising and commercial purposes, provided full credit is given FLORIDA WILDLIFE, and contributors. Clearance must be made with photographers and artists to reproduce illustrations. Second Class Postage paid at Tallahassee, Florida.

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Waterfowl—Ducks and Coots

Season: November 25, 1971 through January 20, 1972
Shooting Hours: One-half hour before sunrise to sunset

The daily bag limit of ducks and mergansers is from one to ten, singly or in the aggregate, depending on the species and sexes taken as determined by the following point system:

The daily limit is reached when the point value of the last bird taken, when added to the sum of the point values of the other ducks and mergansers already taken during that day, reaches or exceeds 100 points.

Point values are assigned as follows:

100 points—canvasback and redhead.
90 points—hen mallard, black duck, Florida duck, wood duck, and hooded merganser.
20 points—drake mallard, hen pintail, green-winged teal, and ring-necked duck.
10 points—scaup (bluebill), widgeon (baldpate), drake pintail, blue-winged teal, gadwall, ruddy duck, shoveler, bufflehead, goldeneye, red-breasted merganser, American merganser, and all other species without a specific point value.

The possession limit of ducks and mergansers shall consist of two legal daily bag limits.

Coots have no assigned point values. The daily bag limit of coots is 15; possession limit, 30.

There will be no hunting of geese in Florida during the 1971-72 waterfowl season.

Leon County and Lake Miccosukee in Jefferson County: Waterfowl hunting permitted only on November 25, November 26, December 24, December 31, January 20, and Wednesdays, Saturdays and Sundays. The use of outboard motors is prohibited on Lake Iamonia and portions of Lake Jackson during the open season for waterfowl.

There will be a special scaup-only hunting season in certain areas of the state from January 21 through January 31 (after the regular waterfowl hunting season). During the special 11-day season, only scaup ducks, also called "bluebill" and "broadbill," may be taken. The daily bag limit is 5; possession limit 10. No shooting will be permitted within 200 yards of any main shoreline during the scaup-only season. Florida's delineated scaup-only hunting areas are: All open waters of Charlotte Harbor from the Florida Power and Light power line 4 miles east of the U.S. Highway 41 bridge on the Peace River and from El Jobean bridge (State Road 776) on the Myakka River to a line running from Boca Grande Pass east through Bokeelia to the mainland. All open waters of Tampa Bay. All open waters of Sarasota Bay south to the Albee Road bridge. All open waters of Estero Bay. All open waters of Lemon Bay. All open waters of the Indian River from the Melbourne bridge (State Road 516) south. All open waters of Biscayne Bay lying south of an east-west line through the center of Featherbed Banks to and including Barnes Sound.

All waterfowl hunters 16 years of age and older must have a 1971-72 Federal Migratory Waterfowl Hunting Stamp before hunting waterfowl (ducks). The stamp is available from any U.S. Post Office at a cost of $3.00. It is non-transferable; must bear the signature of the hunter across its face.

Mourning Dove (three phase)

October 2 through October 31*
November 13 through November 28
December 18 through January 10

*During the October 2 to October 31 phase, in the Northwest Region, that portion of Franklin County lying east and south of U.S. Highway 98, including Alligator Point, will be closed to dove hunting.

Shooting Hours: From 12-noon to sunset

Bag Limits: Daily Limit 12, Possession Limit 24

Marsh Hen (Rails and Gallinules)

September 4 through November 12

Shooting Hours: One-half hour before sunrise to sunset

Bag Limits:

Clapper & King Rails; Daily Limit 15, Possession Limit 30 (singly or in aggregate)
Sora & Virginia Rails; Daily Limit 25, Possession Limit 25 (singly or in aggregate)
Florida & Purple Gallinules; Daily Limit 15, Possession Limit 30 (singly or in aggregate)

Snipe

Snipe Hunting: November 20 through January 20
Shooting Hours: One-half hour before sunrise to sunset.
Bag Limits: Daily Limit 8; Possession Limit 16

Woodcock

Woodcock Hunting: November 20 through January 23
Shooting Hours: One-half hour before sunrise to sunset.
Bag Limits: Daily Limit 5; Possession Limit 10

Archery Season (statewide):

September 11 through October 1.

Legal Game—Deer of either sex (except fawns), bear (in Baker or Columbia counties only), turkey, quail, wild hogs, and unprotected fur-bearing animals.

No open archery season in Dade or Broward counties; in that portion of Palm Beach County south of State Road 80; in that portion of Hendry County east of L1 and L2 levees; or in Collier or Monroe counties south of U.S. Highway 41 (hunting permitted in that tract lying between U.S. 41 and Loop Road, SR 94).

The possession or use of firearms while hunting with bow and arrow during the archery season is prohibited. Crossbows are prohibited. The use of any unleashed hunting dog by any person hunting with bow and arrow during the archery season is prohibited.

Persons holding a valid archery permit in addition to a regular hunting license may hunt on designated wildlife management areas and on open lands during the established archery season.

Season Information 1972

Florida Hunting Licenses

Exempt—Residents 65 years of age and all children under 15. Issued from County Judge and Tax Collector offices, and authorized sub-agents. Costs include issuing fees.

Servicemen, stationed in Florida, are considered residents of Florida insofar as licenses to hunt and fish are concerned.

Series AK—Resident, Combination, Hunting and Fishing, Statewide, Annual	**$10.50**
Series H—For hunting on licensed private hunting preserves only	**5.50**
Series I—Resident, County, Game	**2.00**
Series J—Resident, other than Home County	**4.50**
Series K—Resident, State	**7.50**
Series L—Non-Resident, State	**26.50**
Series M—Non-Resident, 10-day Continuous	**11.50**
Series M-1—Non-Resident County, Owners of and paying taxes on 3,000 acres of land	**11.50**
Series Y—Guide, required for guiding hunting parties. Issued from Office of Commission, Tallahassee	**10.00**
Archery Season Permit	**5.00**
Alien Hunting—Issued from Office of Commission, Tallahassee	**50.00**

Bag Limits

(for turkey and deer sex requirements, see General Regulations Summary)

	Daily Bag	Season Bag	Possession Limit
White-tailed Deer	2	3	3
Turkey—Fall	1	2	2
Spring	1	2	2
Squirrel, Gray	10		20
Squirrel, Fox	2		4
Quail	12		24
Bear	1	1	1
Wild Hog	1	2	2

Shooting Hours—Resident Game

One-half hour before sunrise to one-half hour after sunset; except the Spring Turkey season when shooting hours will be one-half hour before sunrise to 4:00 p. m.

Northwest Region (Jefferson County westward, inclusive)

Deer: November 20 through January 23.

Note: A previously scheduled hunt for deer of either sex in a portion of Gadsden County has been cancelled. There will be no either-sex deer hunting during the general season, except by specific wildlife management area regulations.

Turkey: November 20 through January 23.

Quail and Squirrel: November 20 through February 27.

Northeast, Central, South and Everglades Regions

Deer:

November 13 through January 9, except—

DeSoto, Hardee, Manatee, and Sarasota counties—November 13 through November 28, and December 11 through January 9.

Collier and Monroe counties, and in that portion of Dade County lying west of Conservation Area III—November 13 through January 9, but unleashed deer dogs prohibited November 29 through December 12.

Turkey:

November 13 through January 9, except—

Hardee, Manatee, and Sarasota counties—November 13 through November 28, and December 11 through January 9. No fall open season in Alachua or Suwannee counties, nor in that portion of Columbia County south of State Road 240 and west of State Road 47.

Quail and Squirrel: November 13 through February 20.

Wild Hog:

November 13 through January 9.

Palm Beach and Alachua counties, and in that portion of Levy County lying between the Suwannee and Withlacoochee rivers, generally bounded (north to south) by U.S. 27A, SR 337, lower SR 121, and U.S. 19-98.

Bear: November 13 through January 9, in Baker and Columbia counties only.

Turkey Gobbler: Spring Season

March 4 through March 19 in that portion of the state lying south of State Road 50.

March 25 through April 9 in that portion of the state lying north of State Road 50.

Changes in Hunting Regulations

Florida big game hunters had another seven days added to their 1971-72 season in a summer meeting of the Game and Fresh Water Fish Commission. The extension does not apply to the Northwest Region, but will lengthen the deer, turkey, and wild hog season throughout the balance of Florida through January 9.

The one-week extension was adopted by the Commission at its July business meeting in Tallahassee. The action will provide 58 days of big game hunting, except in the 16-county Northwest Region where the season will run 65 days.

According to Commissioner C. A. Peacock of Miami, the extended season will allow hunters in Collier and Monroe counties and in that portion of Dade County lying west of Conservation Area III an additional seven days to hunt with unleashed deer hounds.

Peacock said last year's season for the southern and central parts of the state consisted of 65 days. The regulations originally adopted for the 1971-72 season set a 51-day deer season, but the more recent Commission action will provide another week of hunting opportunity this winter.

At the same Commission meeting, action was taken to rescind the regulation which had established a two-day either-sex deer hunt in a portion of Gadsden County.

The Ground Dove

By ART HUTT

IF A GROUND DOVE could talk, about this time of the year it would be pleading, "Don't shoot! I'm too small to eat—and besides, I'm a protected species!"

But despite the size differential, more than one of these pint-sized pigeons will fall victim of mistaken identity and get zapped by a quick-on-the-trigger mourning dove hunter.

While general coloration may be similar, size is the quickest determiner, for the diminutive ground dove's body measures at best a mere seven inches and its wingspan, 11. The "monstrous" mourning dove nearly doubles that—with its up-to-13-inch body and 19-inch wings.

The family affiliation is there, however, since both doves are of the family Columbidae, a group unique in that its members feed their young "pigeon milk," a regurgitated product. (Pigeons and doves are also distinguished in that they can drink without raising their heads. They suck water through their beaks, a feat denied other birds.)

The Eastern Ground Dove (*Columbigallino passerina*), only a little larger than a sparrow, is a bird of the South. It ranges from Texas across to South Carolina, being particularly abundant along the coastal plain.

In Florida, ground doves appear almost everywhere—in orange groves and other sandy fields, on Gulf and Atlantic beaches where they feed among the dunes, on vacant lots and unworked fields, and even in the quieter residential areas.

Their coloration tends to tones of gray—lighter on the head and back of the neck, darker on the back where the feathers are tipped with black, and lighter underneath with a hint of lavender shading. In flight, the bird flashes a rusty color from the undersurface of its wings. Its feet are flesh colored, and the reddish beak is black tipped.

The ground dove is the smallest member of the dove family found in the eastern United States. In addition to its "pint size," its stubby, squarish tail is a reliable identifying feature. On occasion, especially during courtship, ground doves hold their tails upright in a bantam chickenlike display.

Apparently, ground doves mate for life. They are commonly seen in pairs, or in pairs within small, loose flocks. (They do not concentrate in great numbers as do mourning doves.)

When it comes to nesting, these little birds display much energy, working from January to October, getting off as many as four broods a year. Little time is spent in nest building—anything from a grass-lined depression on the ground to a loosely-knit set of twigs on a low branch suffices. Frequently, ground doves will take over an abandoned nest of another bird, making slight repairs if necessary. Once a nest is built or occupied, they use it for the whole season.

Two white eggs are laid per clutch, and both male and female take turns during incubation. If approached while at or near their nest, ground doves will feign injury and move away to divert any would-be predators—including humans.

The young doves thrive on their early diet of pigeon milk. When they leave the nest to forage for themselves they eat seeds of weeds and grasses and spend much time searching for grain in fields which have been harvested. For a change of diet, they'll also eat berries and insects.

The ground dove's call is a mellow "coo" that is sometimes repeated to the point of monotony. So soft and crooning is the note that in some areas the little bird is called "moaning dove." "Tobacco dove" is another nickname for this bird, but I wouldn't know where this arose, unless, perhaps, the ground dove has an affinity for tobacco fields.

Always reminding me of a parakeet, ground doves are gentle, friendly little birds—generally trusting and unsuspicious of humans. As they walk about, their heads bob with each quick little step. If approached too closely, they fly at the last instant but settle to the ground quickly to resume their short-stepped search for food.

While known for their gentle nature, ground doves quarrel readily amongst themselves—but with very little damage resulting.

Unlike the mourning dove, the ground dove does not migrate. It spends its life in the same general locality, making short, low flights from one feeding area to another. And, unlike the popular hunter's target, the mourner, the little one is a fully protected bird under federal law. The ground dove is classified with the songbirds and is never hunted, nor can it be caged or otherwise molested.

Such protection couldn't have happened to a nicer little bird. ●

FISHING

Deep Water Jigs

using a jig in really deep waters is nothing new, but is fast becoming more popular with the increasing number of deep-sea fishing boats

By CHARLES WATERMAN

DEEP JIGGING is not a new method of fishing, but it is coming on faster than any other method I can think of. Nothing complicated at the first impression; you just throw a jig over the side and when it sinks to the bottom you start yanking it up and down until you have it cranked in.

I did this years ago when I thought deep jigging was in water about 10 feet deep and that half an ounce was a really hefty jig. I've caught some bass and some crappie that way, then a few snook along the Mangrove Coast of southwest Florida. I have wondered why an up-and-down motion of any lure would be attractive since I can't think of any natural fish food that always travels vertically. I believe the main attraction is the wide variety of fish caught since almost anything can come along over a reef that's a lot of miles out to sea. Down to about 150 feet the system works well if there's not too much tide run.

A deep jigging outfit includes a poker-stiff rod that will handle a 3-ounce jig without buckling in the middle, a reel with a fast takeup, and a lure that goes up to four ounces in some cases. If there's lots of current it's an advantage to have the lure streamlined so it'll sink fast instead of being swept off to one side by the current. The jiggers I've encountered like a big spinning reel because of the fast retrieve, but a husky level-wind reel is a close second. The line can be around 20-pound test. Very heavy line has so much water resistance it is easily bothered by current.

Other things besides jigs will work with the same system, and a spoon that wobbles on the way down has a different kind of attraction although it may be too slow for fast-moving water in a heavy tide run.

I'd never used a jig in really fast water until last summer when they let me try it up off Cape Hatteras, N.C. There was one spot where we couldn't get the jigs to the bottom at all. They were simply swept away. It turned into hard work and you could gain by throwing the jig upstream and letting it sink as it went by, but it still didn't get to the bottom. It would get to a fish occasionally though.

Since I am not noted for my grace in jigging, operating something like a chimp with a pitchfork, it came as a surprise when something happened down there and I noted the drag was giving line. After considerable sweaty pumping I landed my fish and Joel Arrington of Raleigh made me feel very good by saying it was the smallest amberjack he'd ever seen. I thought it was pretty big. That was at the Diamond Shoals tower out from Hatteras on the Outer Banks.

Deep jigging around Florida is boosted by the increasing number of good-sized fishing boats capable of going out where the water's blue, and some coastal fishing clubs are pretty well gone on the subject. The small recording fathometers are the answer if you're looking for fishy bottoms.

A great many of the jiggers use strip bait along with feathers, hair or plastic jigs. I don't think the strip adds that much to the appearance but it certainly adds a lot of attractive smell. Still, plenty of fish are caught without it.

I NOTICE a suggestion from Johnson Reels about spooling monofilament line on closed-face units, and it's something I should have mentioned long ago and never have. The idea is that if you are reeling line with little or no resistance on the other end you should run the line through your fingers for a little tension. That puts the line on the spool solidly instead of letting it fluff up and snarl your next cast. If your lure pulls fairly hard in the water during the retrieve, the finger tension isn't necessary, naturally.

The other extreme is monofilament that has been spooled on so hard that it cuts into the line already on the reel, a sure beginning of casting problems. That can happen when you set your drag too tight and are a little careless with your pumping. Even careful pumping on a heavy fish can cut the line into the spool while you're not even winding. It happens with any kind of reel with extra strong drag settings.

WHILE I AM QUOTING smarter fishermen I shall grudgingly mention something recommended by the Newton Line Company people. When you first arrive on the fishing scene, they say, make a few casts with one of your heaviest lures. Stretches things out and gets them working. Dragging a line behind the boat without a lure can serve a similar purpose.

(Continued on next page)

(Continued from preceding page)

I AM CONTINUALLY shaken by the fish-eating customs of people in Key West, Tallahassee, Maine, Borneo, and the Bahamas as well as most other places I have been. Not only do they dislike and like different fish but they like and dislike them for different reasons. Maybe I'm a little strange about fish myself.

At many restaurants and in many homes, the catfish is considered a delicacy—fresh water catfish that is. Salt water catfish are very seldom eaten in Florida, and when a bridge fisherman catches one he is likely to beat it to a pulp with a maniacal look on his face. I have heard that the fresh water variety is no better than the salt water cat to eat when it comes right down to a frying pan. There are others who say they have no objection to the gafftopsail catfish but wouldn't eat the ordinary variety. One objection to eating salt water catfish is that there's no telling what it's been eating, according to one of my sources. Personally, I don't know what the fresh water catfish have been eating either.

Bonefish are aptly named, and I assumed they were no good to eat until I wandered into the Bahamas and learned the natives considered them wonderful fare. At a hotel over there I ordered bonefish and found it very good indeed, but the bones were still present. It may be they could be cooked until you could chomp up bones and all. I don't know about that, but it certainly isn't eaten much around here. I believe Art Hutt said he ate bonefish one time down in the Keys.

Any saltwater trout draws a premium price as seafood. Personally, I never cared much for them. I guess my favorite fish is snook when it comes dinnertime. Back in the days when snook were fished commercially, they had to give it a different name in the restaurants though. Snook just didn't sound good. If you called weakfish glunks instead of trout I'll bet the price would go down.

More on the snook business. I have read articles by respected authors of outdoor gospel stating that the name "soapfish," sometimes applied to snook, was very appropriate since the fish is very inferior food. But then I've also read that hooked snook prefer to run for open water.

You will be overjoyed to know that Maine residents have such a low opinion of their solid-fleshed, cold water smallmouth bass that very few of them will eat bass at all. That's brook trout country and a Downeaster would usually prefer a pale, pellet-fed hatchery trout to the finest bass that ever swam. The thought of actually cooking one of our mud-crawling, warm water Florida bass is very distasteful to many northerners.

The Gafftopsail catfish, left, will hit artificial lures and is supposed to be good eating, although few Floridians will even try it. Built for speed, the wahoo, right, is one of the fastest of all the salt water fishes. When spooling monofilament on a reel, above, run line through fingers for tension.

Garfish are not exactly a gourmet's delight for most Floridians, but Seminole Indians have been eating them for a long time with no complaints. I'm not so sure about the mudfish or bowfin, but I've heard they're all right if they're cooked right.

I once discussed the fish subject with a lady who used to work in Florida restaurants long before the restaurant inspections were serious. She told me the flossy Palm Beach eatery at which she was employed had an impressive list of various kinds of fish with appetizing names but that all of it came off the same grouper. She said the chef cooked it differently for the various orders.

I have never eaten a piece of tarpon, and it doesn't look good to me, but I know some people have made some sort of chowder from it. I have heard a piece of tarpon gets bigger as you chew it, but I wouldn't know.

I think preparation is about 90 percent of the whole business. If you take a warm weather Florida largemouth bass and cook him with the skin on he's too rank for me. Peel the fish before you cook it and I've yet to find any with an objectionably muddy taste. I've heard repeatedly that small bass are much better than large ones, but I don't see much difference when the pieces are sliced the same thickness.

Some fish take special preparation. I understand jack crevalle is good if you bleed the fish as soon as it's caught but few Florida anglers would keep one.

Size seems to be important in most salt water fish. A channel bass or red drum loses much of its quality after it reaches ten pounds, but there are methods of cooking the big ones so they get by pretty well. There are similar size requirements on other species.

You're taking a chance with any unfamiliar fish when you cook it with the skin on because that's where much of the taste of unpleasant water seems to accumulate.

Skin all of them, give them pretty names, get the right chef, and the seafood menus will even up pretty well.

MEASURING THE SPEED of fish is very difficult, and I suspect that some of those that move quickest in getting started probably don't have much of a score over the long haul. A black bass, for example, is quite agile as a youngster but tires quickly. I doubt if he ever really makes very many miles per hour.

A bonefish gives an impression of great speed when he takes off across a shallow flat—largely because he throws mud and seashells—but if you put a clock on him I doubt if he could beat a coonhound flat out. I once read that a bonefish could do 70 miles an hour. I believe he would get carsick just riding that fast.

Evidently the offshore species are by far faster than the others. I have heard the wahoo is about as fast as any and I'll go along with that. I saw one take a casting lure on that Hatteras trip and he ran at right angles to the rod while he was still fresh. The line threw up a geyser behind him. It was the fastest I'd ever seen a fish go anywhere.

Fish tire very quickly if they turn on all the steam. After the first few seconds you're generally playing a fish with the edge already taken off. It's especially noticeable with tarpon, which give the first impression you couldn't hold them with a dragline just after the strike, then slow down to very moderate speeds. I have read historical accounts of the first tarpon fishermen who used gear that would drown a 12-foot shark—and had it broken. Evidently they tried to stop the fish immediately.

After all, a man's extreme effort can be maintained for no more than fifteen or twenty seconds. Track and field events show that pretty plainly.

I'VE SEEN MORE ALLIGATORS this year than have shown up for a long while. The first impression is that they're increasing rapidly due to tougher laws for their protection. Undoubtedly the population is going up but not at the rate it appears. It's largely a matter of the 'gators appearing in places where they would be collected quickly if poaching hadn't slacked off.

THE COMBINATION of drought and summer rains that followed it made the mosquitoes bad in south Florida. Some of the weathered veterans told me it was the worst they'd ever seen. Every time I spray on some insect repellent I wonder what the Spanish explorers did when the mangroves appeared to have smoke around them. Some of the new sprays stop a flock of mosquitoes as if they'd hit a window. Help a lot with redbugs, too, if you'll squirt carefully around your ankles. ●

"TURN JAKE LOOSE!" Elbert Wadford called back to his partner at the pickup truck. I was hurrying forward to better hear the white and black Walker hound he called Georgie give tongue as she pursued a northwest Florida bobcat. She was in a deep bottom, and from where we were on the high ground her solo voice was muffled. We would have to get closer to hear her better.

It wasn't long before we saw Jake come loping along toward us. When he heard Georgie's melodious tones, he lit out in her direction. Wadford called for another cat dog, Mary, and in a matter of minutes all three hounds were sounding off—joined in the chase.

Elbert and I were both out of sight of the pickup now, but certainly his buddy Ferrell Courtney, another cat hunter, would hear the race and turn the rest of the pack loose. Still, we were anxious, continually looking back for the rest of the hounds to come into sight.

Though it seemed a long time—and I'm sure it wasn't—they finally appeared. Hearing the trio down below, they raced to join the fray. Soon the bottom was reverberating with the music of 10 cat hounds!

For a hound man, it was a little bit of heaven right here on earth.

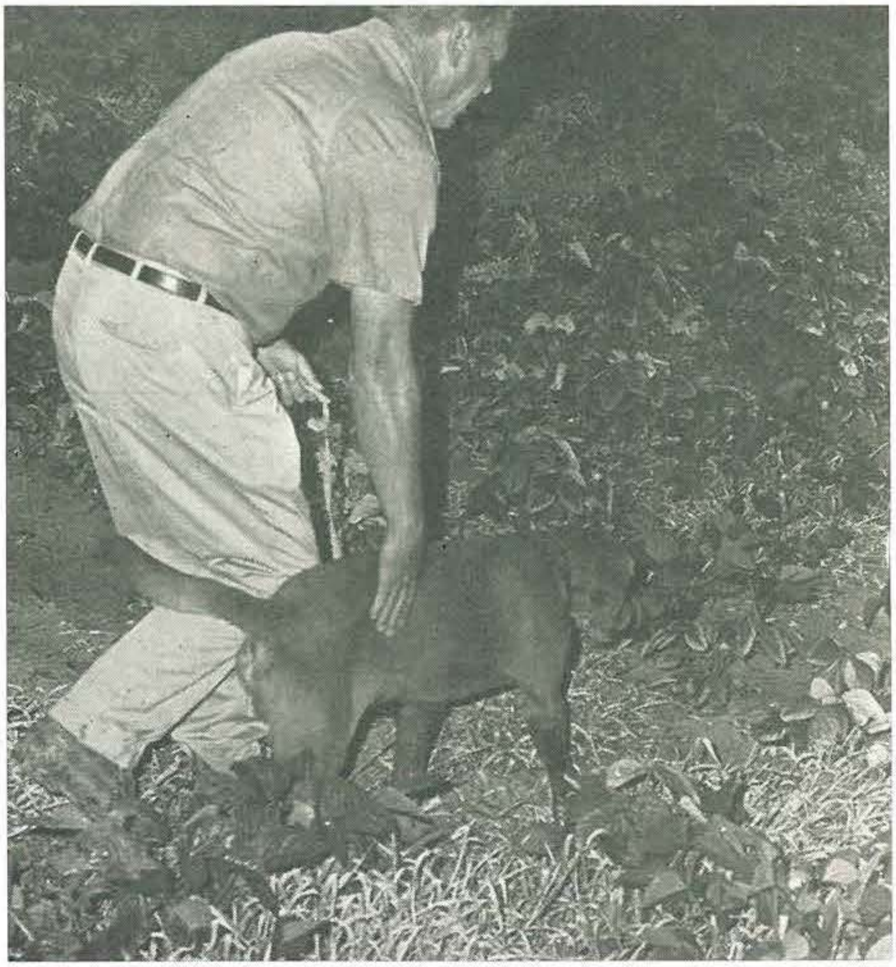
We had spent all morning and all the day before looking for bobcats—without success. It had been frustrating, but now it seemed all our efforts would be doubly rewarded.

I'm an outdoor writer from Pennsylvania, and when I heard that the Outdoor Writers Association of America's annual conference was to be held in Pensacola in 1971, I immediately started laying plans for a bobcat hunt. Although I don't call myself a cat hunter, you might say I'm a "dog man." I love hunting of any type—as long as it can be with a dog.

The OWAA meeting is always held toward the end of June. That precludes hunting most game species with dogs. (In fact, most sportsmen's minds are on swimming, fishing, boating, water skiing, etc.) So what could a fellow expect to hunt in Florida in June? Not quail; not deer. Just raccoon, fox, and bobcat—and I'd heard that bobcat hunting in the South is tops during the summer season. That's what I hoped to find out for myself.

Carlton Jackson of Tallahassee, who works for the Game and Fresh Water Fish Commission and

Bobcat Bonanza



By **NICK SISLEY**

The hunt begins when fresh tracks, right, show the presence of a bobcat. The objective of the hunt, above, offers sport with dogs when other game seasons are closed. A cat hound, at left, is turned loose by the hunter on bobcat trail.

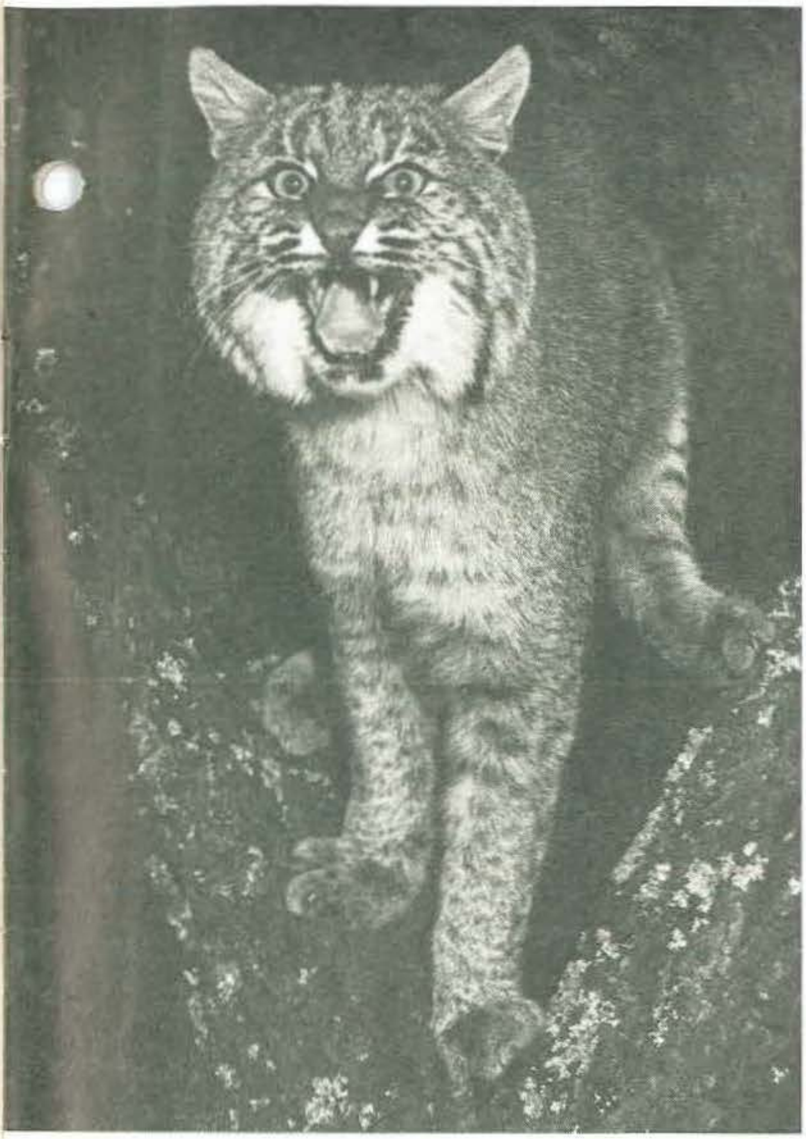


Photo By Leonard Lee Rue III

was attending the OWAA meeting, was born and raised near DeFuniak Springs in Walton County, the area we would be hunting. He had put us in touch with Elbert Wadford of Crestview, and Elbert had brought along Ferrell Courtney of Baker, a regular cat hunting buddy who also owns hounds.

Elbert has to be one of the most knowledgeable dog men and bobcat hunters in the entire State of Florida. He has maintained a pack of cat hounds for more than 25 years, and prior to that he was a fox hunter. Even before that, he cut his teeth on a coon hound's collar.

Ferrell, though somewhat younger than Elbert, belies his years with his great cat savvy. He hunts bobcats, and studies their ways, practically every weekend.

I was mighty proud to be in the company of those two for a taste of northwest Florida's bobcat bonanza.

A successful cat hunt means early rising, knowledge, luck, and a lot of hard work. You start at 3:00 a.m. You quit when you're done. That's when all the hounds are back in the dog box, maybe 12 to 15 hours later!

The idea is to cruise the sand roads looking for bobcat tracks. Experience in knowing where to look and what to look for is most important. Elbert and Ferrell amazed me in this department. Once it was full daylight, they could often sit in the cab of the pickup and spot a cat track, differentiating it from a fox track—something I have difficulty doing even down on my hands and knees. Even then, it must be a well-defined print!

Now, finding a cat track isn't difficult. Finding one the dogs can run *is*. You see, a bobcat may travel as much as 10 or 12 miles in the course of a night's feeding. Much of that will be on the easy walking of the sand-rut roads, too. When a road track is found, Elbert or Ferrell will track it themselves, leaving the hounds in the box. This they do at a brisk walk.

In following up a track visually, they are trying to determine whether or not the cat is headed for a place to lay up. After a night of feeding—cats are nocturnal—they find a spot to spend the day resting. If the hunters find tracks leading to resting cover, they'll turn out one old, experienced canine—called a strike dog—to see if he can jump the cat.

We were hunting a huge farm tract in central Walton County. The crops were corn and soybeans. In the dry, sandy soil and sparse vegetation, hounds can seldom scent a cold trail. (Elbert is of the opinion that bobcats leave a limited amount of

(*Continued on next page*)

Photo By Nick Sisley

(*Continued from preceding page*)

scent and that cat dogs don't follow scent on the ground. He thinks they depend on the scent a cat leaves on the surrounding foliage it brushes against.)

If the strike dog failed to hit a good scent trail in a thick laying-up place, Elbert caught him, loaded him back up, and looked for a fresher track on down the road.

To prove that cat hunting isn't easy, or productive every time out, the first day of my hunt we hardly heard a bark out of the dogs. However, we saw what was, to me, an unusual number of cat paw prints.

The next day was a repeat of the first—unsuccessful, at least for the first six hours of the morning. But at 9:00 a.m., Elbert turned out Ferrell's strike dog, Georgie, on a track that looked really good. Our hopes were sky-high. Georgie sounded like she had something. She barked with enough enthusiasm that we both were optimistic that she'd jump this one.

I walked out in the soybean field, swatting at the infernal gnats, while Elbert hopped in the pickup to go get Ferrell and Art Runnels of Panama City, who was also hunting with us that day. We had dropped them off 15 minutes earlier with another strike dog to see if they could work out another track that looked promising.

It was an hour before we found Georgie again. That was when she struck and we'd called for Jake and the other hounds. Now, we had the entire pack of 10 hounds making music!

Listening to the race, I was in my glory. If you're a hound man, you would have been, too. And there is something about a cat chase, once the prey is jumped, that exceeds all other forms of hound sport. I guess it's simply because the hounds are so close to the cat, driving him so fast. There are no lapses in the fervor of their barking. It's one steadily building crescendo of sound from start to finish. It's beyond description. Too many sights, smells, sounds, and inner sensations. You have to be there to believe it.

Now, with the full pack close on his short tail, this feline decided to leave the confines of the bottom—pronto! He lit out along the edge of the swamp, then up a head of uncleared brush that extended to higher ground up alongside the cultivated fields.

Next, he left the head and streaked out across a grown-up field, then into a cornfield, hoping to lose the hounds in there. We missed seeing him in the open even though we had been running trying to catch up with the chase. Ferrell stayed with the hounds on foot.

One of my cameras was still back in the pickup, and Elbert wanted to drive it around to a more advantageous spot. Art and I went with him. When we got situated, the dogs were driving the bobcat in another small head. They had been pressing him for many long minutes now. Cats are not like foxes—able to run for hours and hours. It seemed this one would have to give up soon. I learned from Elbert that these northwest Florida bobcats sometimes don't tree to escape the dogs, which is usually a fatal mistake. But for every one that *doesn't* many a one *does* and lives to run again, which suits the dyed-in-the-wool cat hunter just fine, of course.

There was a huge cornfield next to the small head—with a 10-yard opening between. Now it appeared the cat was headed for this spot, with the hounds still driving him furiously. I saw him when he leaped through the opening, thinking for a split instant it was one of the dogs! The bobcat stood that tall. Seeing this wild creature was one of my supreme outdoor thrills. But there was little time for savoring the moment, for the cat had no sooner disappeared into the cornfield than the pack raced out of the brushy head. They were practically running a sight race now!

Then, amazingly, the dogs lost him for a moment or two—for the very first time. He must have squatted out in the middle of the field between the corn rows, for there was no other cover available.

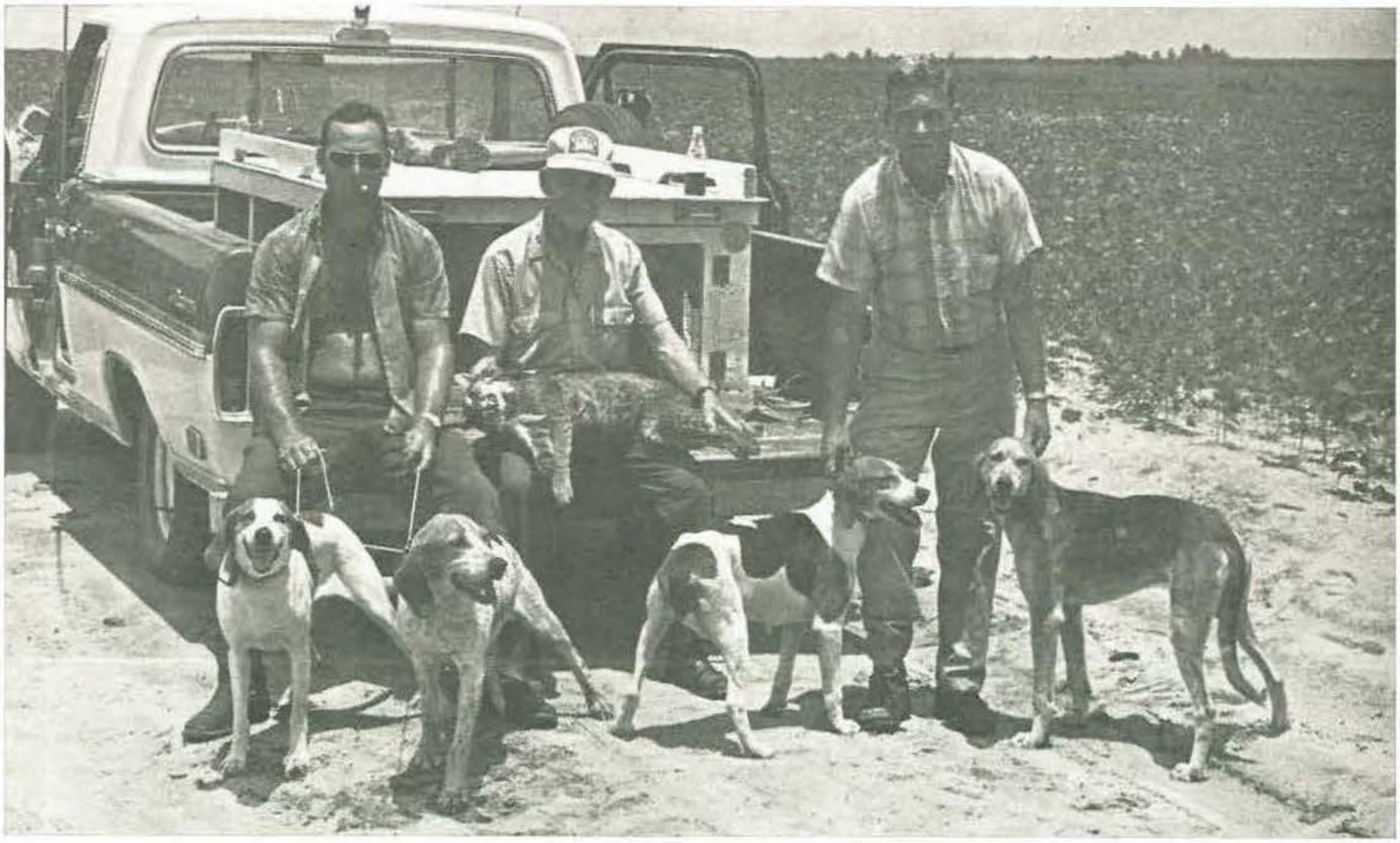
The minutes of uncertainty seemed like an eternity, but Georgie, the strike dog who had started it all, was not to be denied this cat. She jumped him again and he raced back across the clearing and re-entered the head. Soon, the whole pack was again in merry chase.

We saw the cat twice more before it finally came to bay, and on one of these occasions it darn near bowled over Art Runnels, who took a half-hearted kick at it as it sped past him.

The big cat was bayed in the middle of the head. We had to crawl and claw our way into the dense thicket to reach the prize. When we finally got to him, he was lying on his side with his back against a fallen log. He was in perfect fighting position, but as it turned out, hardly in fighting condition.

One of Elbert's young pups was the only hound baying the cat. The others were all giving him a wide berth. But there was to be no fight this time. The exhausted bobcat was done for. He gave up quietly, and not a tooth was laid on him. The still-cautious dogs would only come close enough to sniff at him.

The June sun was now almost unbearable. The gnats buzzed continuously around our ears. The excitement had begun to subside, but I was still sweating profusely. In spite of the heat, the bites,



At the end of the hunt, the successful bobcat hunters pose with their quarry and the experienced cat dogs. Although this cat fell prey to the hunters, many live to run again.

Photo By Nick Sisley

and the briar scratches, this was one of the most memorable hunts I have ever been on.

But the next morning we again met at an all-night restaurant in DeFuniak Springs for hotcakes, grits, and eggs—all eager for more of the same. Shortly after that last swallow of coffee we were in the pickup looking for another bobcat track.

Carlton Jackson, who had been with us on the two previous days' hunts, had Clayton Gilmore of neighboring Okaloosa County with him today. Clayton had been the man who contacted Elbert Wadford and set up this series of cat hunts for us.

Shortly after daylight, we found a track that went into a cornfield. Elbert was confident the dogs could run this one, though I couldn't figure out why he thought so. Usually a cat lays up in a head, not in a cornfield. Anyway, we depended on Georgie again, for both of Elbert's strike dogs had been turned out earlier in the morning on tracks that turned out to be too cold.

Georgie opened as soon as she got in the field. It was apparent the cat was close by, and in a matter of minutes she jumped him.

It took some doing, but soon we had the entire pack in to help her.

I was particularly anxious to see the cat ahead of the dogs again this day, and time after time he would come right to the edge of that cornfield only to turn back and stay inside.

Sixty minutes after turning Georgie loose, Ferrell claimed a kill. The tempo hadn't sounded like it changed to me. How he recognized the chase was over, only dedicated hound men can appreciate.

We ran up one of the corn rows at full tilt. The stocks were still wet with morning dew. My shirt was soaked in no time, but in June's heat it felt good.

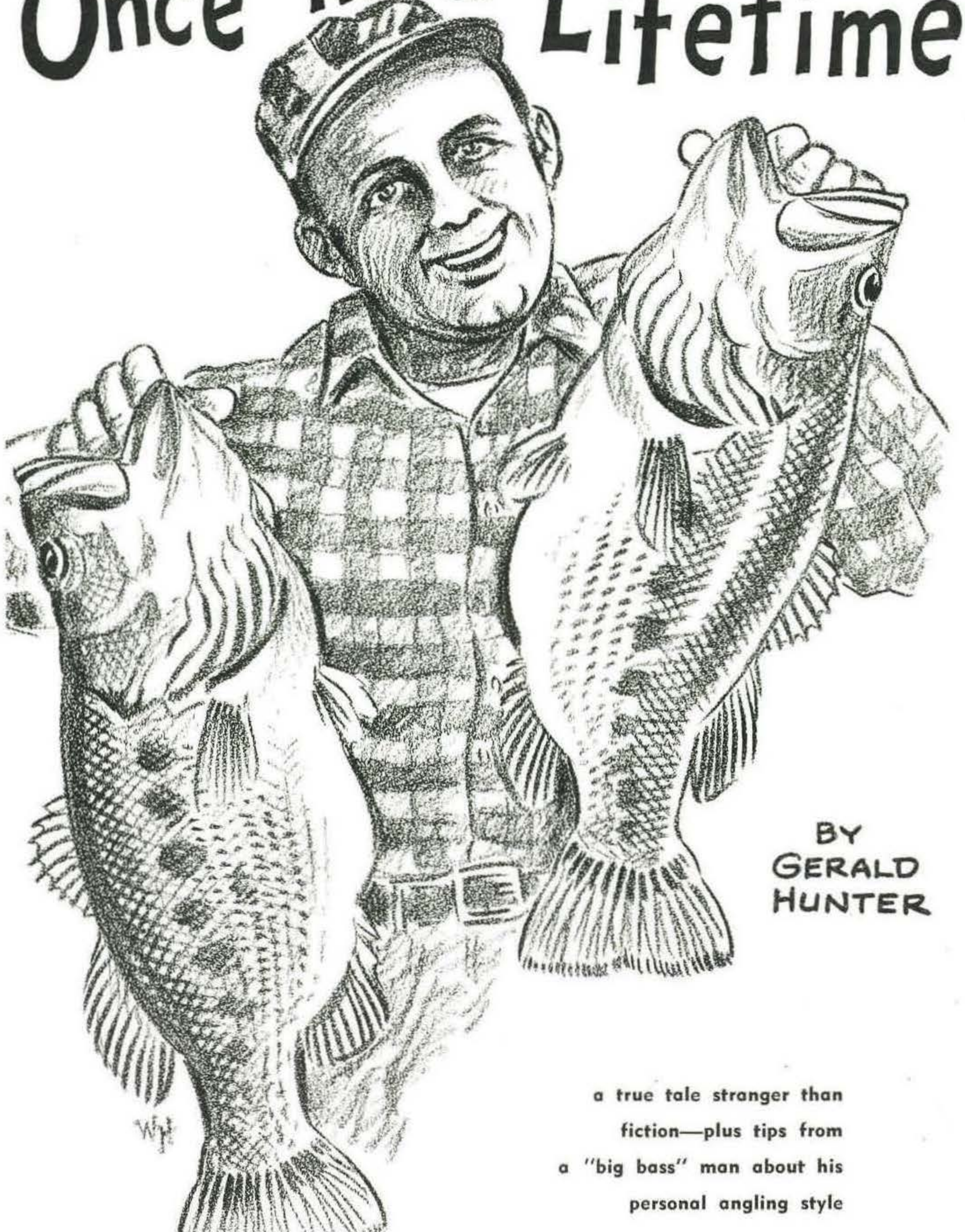
When we got to him, sure enough, the cat was dead. One of Elbert's oldtimers had been in on this chase. Elbert called him Logan. Approaching 12 years old, he's been in on something like 200 bobcat kills. (He had not been in on the previous day's race, having been at home resting up. Elbert claimed that if old Logan *had* been there, that first cat would have been dead when we reached him, too!)

It was a great ending to the hunt that had been planned many months in advance. Our success ratio of two cats in three days must be regarded as highly unusual, for although Florida has an abundance of these wily critters, they are a secretive species and hard as heck to come by—even with the fine cat hounds and the world of knowledge and experience we had going for us in Elbert Wadford and Ferrell Courtney.

If you can ever get with these two northwest Florida hunters for a weekend of dog sport, and if you're lucky enough to catch a bobcat or two, it'll be a weekend you'll never forget.

That, I can guarantee. ●

Once in a Lifetime



BY
GERALD
HUNTER

a true tale stranger than
fiction—plus tips from
a "big bass" man about his
personal angling style

JERRY BRUNDAGE of Evergreen, Alabama, has done something that I, with twice his time outdoors, have never done.

Neither have you.

On March 14, 1971, a few minutes after the noon hour, he caught a 14-pound largemouth bass.

Oh, I know this immense fish isn't *the* world record. But the clincher is that only an hour later, he caught *another* 14-pounder! This feat is without precedent, and I'm afraid it will never happen again.

There were some intriguing aspects to Brundage's accomplishment. One of them was that he was lost when he caught the first whopper. Another was that of 12 bass previously hung by him and his fishing companion that Sunday morning, all were so big that each broke new 20 and 25-pound-test lines.

If you don't care how Brundage catches bass, read no further. On the other hand . . .

Jerry is a softspoken, pleasant young man of 26 with brown hair and blue eyes already crinkly from scanning bright waters. He's a bit over 5′ 7″ and his 155 pounds ride easily in his 14-foot semi-vee Kennedy Kraft.

He has fished at least three times a week since boating his first bass the day before he turned five years old. (He had a top coach: his late father.)

This chronicle began on a Friday after Jerry and his friend John Fleming had heard all they could stand about the consistent catches of really big bass from Lake Jackson, which is in Leon County, Florida—250 miles from Evergreen, Alabama.

They drove down in their well-traveled camper and set up at Trade Winds landing on the west shore of the 4,000-acre lake.

The pair fished hard all day Saturday in steady rain and increasing cold. Wet and chilled and fishless, they quit in midafternoon and headed back to the camper, only to discover they had left the windows open and everything inside, including their sleeping bags, was soaked.

They spent all night drying out and got back to fishing Sunday morning. This time, to save face, they abandoned the artificials they usually use and bought some live shiners.

Golden shiners, or "roaches," look like small tarpon with red fins. "You don't catch big fish on small baits," said Jerry, "so we got shiners that were 10 inches long."

Brundage uses neither thermometer nor depth finder. Instead, he hurries to his target area with a 25-horse Johnson, then eases along with an electric troller, searching for a hole deeper than the surrounding bottom. He uses a weight to plumb for depth.

They didn't find what they were looking for until nearly noon—a hole 12 feet deep where the lake bed averaged only six feet. John Fleming was using a 25 pound test line. Brundage was using a Shakespeare 788 spincast reel with the 20 pound line that comes on the reel, and its matching light action Wonderod. He attached a 4/0 Eagle Claw hook, clipped a plastic float 3½ feet above the hook, spiked on a shiner just behind its dorsal fin, and pitched it out 15 feet from the boat.

"A sinker ruins the bait action," he explained, "and you have to fish close to the boat or else there's so much spring to the line that you just can't sink your hook into a tough, big bass."

Within the next hour Jerry and John each hooked and lost six huge bass. The bass didn't get off. Each broke the line.

At noon, Jerry put their last shiner on and pitched it back to their hole, and his float never stopped moving. Thirty embattled minutes later, he had his first 14-pounder. It was the first bass he'd ever caught that ran above 11¼ pounds.

They started back for the landing and more bait—only to discover that they were lost. They'd been so busy scouting, they couldn't remember where the landing was. But they found the landing, weighed and iced the big bass, bought some more shiners, and roared back to their hole.

They got only one more strike. It was Brundage's second 14 pounder, boated at 1:15. Another hour of fishing was negative.

Each of the two fish weighed less than one ounce over 14 pounds.

Brundage fishes only for big bass, and he travels a lot doing it. He said, "Most of the things you read about bass fishing are okay if you want just fish. But if you go only after big ones, the rules change."

Here is what he told me.

"Find deep holes surrounded by open water, no matter what state you're fishing in. You'll catch the biggest bass just before and just after the bedding season, when they won't hit anything except live bait. You'll catch the MOST big bass at night during June and July. For this I use only two lures—no doubt others are just as good—a broken-back black Arbogast Jitterbug and a multicolored South Bend Nip-I-Diddee. The colors don't matter, since a nighttime bass hits by sound only. Always use a limber rod, despite what you read. If you use a stiff one, you'll get too impatient and break the line. Use big lures for big fish."

I asked him: "If you had only one piece of advice for a fellow who wants to catch big bass consistently, what would it be?"

Jerry thought a minute.

"I don't consider myself a pro. That is, I don't care a thing about these bass tournaments. But the best advice I could give would be this: Have faith in your lure, and keep fishing. It isn't terribly important which lure you use. Put on a big lure, don't change it, fish all through the day, and usually you'll get your share of fish." ●

Lake Enrichment...

a question and answer primer on a vital environmental problem

By **ART HUTT**

What is enrichment?

Enrichment can be any substance, which, when added to water, makes the water "richer." It can be man-caused (preventable), such as sewage plant discharge, or natural (unpreventable), such as a tree falling into the water which will eventually decay and release its elements. Enrichment of a lake can be compared to adding a fertilizer to our lawns to stimulate growth.

How can water grow things?

Any amount of natural water has life in it, big and small. You need a microscope to see many of these organisms, but others, like algae, weeds, and fish, are obvious. As the "fertilizer" enters the water, it affects all living things. Algae, especially, respond to it and grow in proportion to the least limiting substance or condition. In this respect, a "crop" of algae is no different from a farmer's crop of corn, melons, or any other agricultural product.

What is in this enrichment?

There are 10 basic and about seven minor elements needed for plant growth. Algae growth, the principal problem in lake enrichment, is especially stimulated by carbon, nitrogen, and phosphorus (the important element of phosphates), assuming the other necessary elements are available in sufficient amounts.

Why not control these "basics"?

While there is some possibility of carbon control in domestic wastes, free carbon dioxide is very difficult to regulate, and since nitrogen constitutes about 80% of the atmosphere, it, too, defies management. (The more obnoxious species of algae can utilize atmospheric nitrogen.) Rain deposits several pounds of nitrogen per acre yearly. Phosphorus, the indispensable "building block of all living things," is the only major element over which man has some control.

How is phosphorus so important to algae growth?

In the unit-plant-food theory, growth of a hypothetical algae may depend upon ten units of carbon, five of nitrogen, and one of phosphorus. If it lacks that one unit of phosphorus, the effects of the carbon and nitrogen are nullified. While phosphorus is an abundant natural element, many of our sources of phosphorus are man-made and therefore can be under some control.

Where does the phosphorus come from that enters our lakes?

Main sources are agricultural runoff, human wastes, and phosphate-heavy household and commercial detergents, the latter being perhaps the biggest single source of phosphorus introduction.

While more phosphates are used in agriculture than in the detergent industry, less reaches the water in usable form. First, the phosphates are taken up into plants and a major part is carried away in a harvested product—an ear of corn or an orange. Also, with the exception of direct runoff, phosphates must work towards the water through the soil, and they stick to silt particles and are not immediately available to algae in the water. But in detergent form, the phosphates are in solution and when discharged through sewage treatment plants become immediately available.

Other phosphate sources in Florida include runoff from mining operations, industrial wastes, street runoff, and nutrients leached from drained marshes and garbage dumps.

How about nutrients in human waste?

Every adult in the USA contributes 1.4 to 4 pounds of phosphates per year in his liquid and solid wastes which leave the sewage treatment plants to enrich our waters. Urine contains 85% of the fertilizer value (mainly nitrogenous, however) of the human by-products, and is not retained in the sludge of the ordinary sewage plant but passes out directly with the effluent.

Then what good are sewage treatment plants?

A properly working sewage plant renders water disease-free, nearly fit to drink, as was emphasized several years ago by a prominent water quality specialist who shook up his audience by suggesting that the water on their tables in Cincinnati, Ohio, had probably passed through seven bladders already. But the typical sewage plant can do very little about removing all of the nutrients.

We can go to the moon but we can't remove nutrients from water?

While nutrient removal is possible through additional treatment of waste waters, construction of these units at every sewage plant would be a slow and costly procedure. The experts feel a quicker, less costly approach is to start first at the source by reducing or eliminating phosphates in detergents, which account for 45% to 75% of the total phos-

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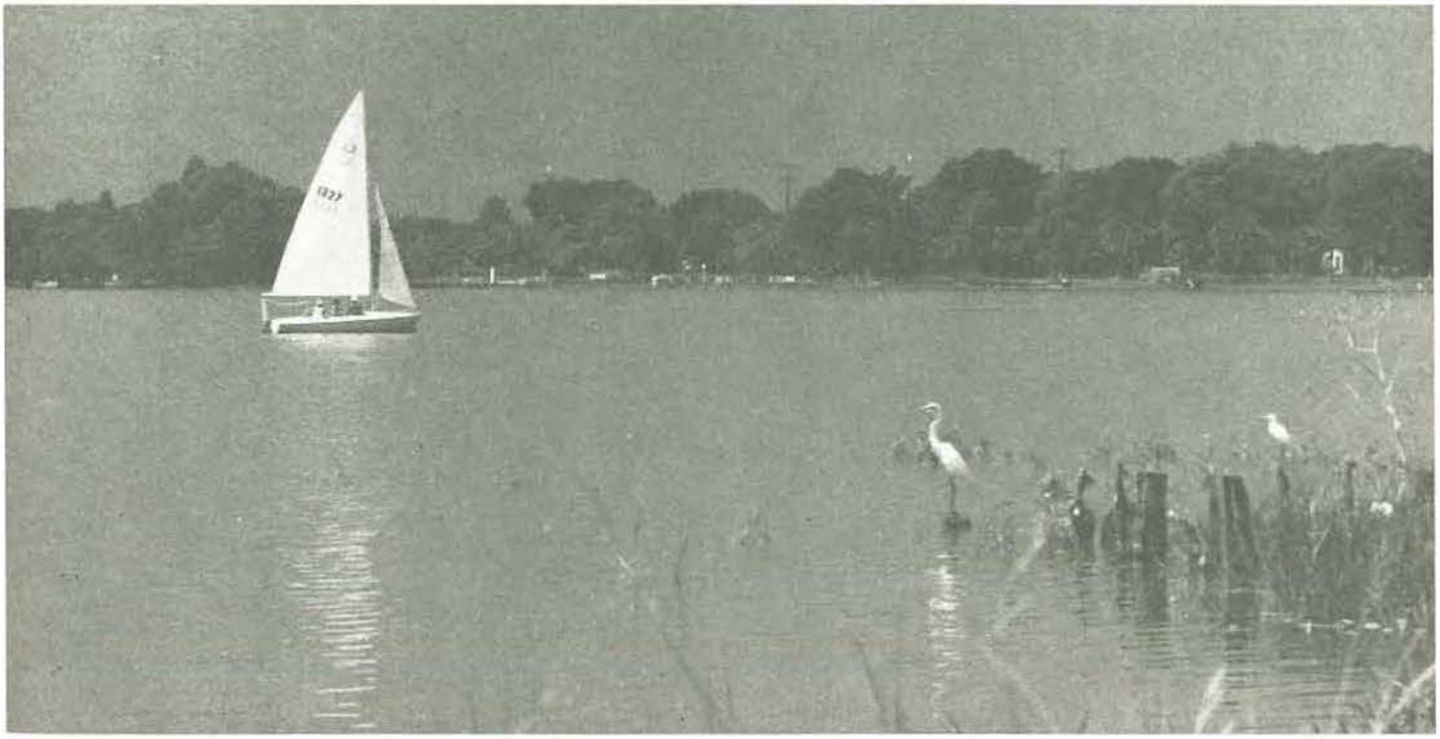
The heavy growth of algae in the water, shown above, is what can be expected when industrial, agricultural, and human waste is allowed to enter a lake. Idyllic scenes, below, may soon disappear because of careless pollution.

Photos By Art Hutt



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phates in sewage effluent. Improved sewage treatment should be proceeding at the same time, however.

How can water be "fit to drink" but fish cannot thrive in it?

It goes back to the same idea—a sewage plant can render water free of disease-causing bacteria but it cannot filter out all of the nutrients. An excess of these nutrients, then, creates an unfavorable environment in which desirable fish cannot thrive. It is not necessary to actually kill a fish by lethal doses of a poison—a change in its environment can be equally effective.

How can nutrient-caused changes eliminate game fish?

Modification in oxygen supply, bottom composition, water clarity and temperature, type of vegetation growth—all can create conditions unsuited to game fish, and more favorable for rough fish, such as shad, suckers, garfish, and bowfins.

How could abundant algae cause all this?

Algae are little plants which can produce oxygen under favorable conditions. But at night, and during conditions of dull, cloudy weather, they *use* more than they *produce*, therefore taking it away from the fish, causing what is commonly called a fish kill.

Abundant algae discolor and cloud the water, making it difficult for sight-feeding game fish to catch their prey. Sandy bottoms become covered with dead organic material and spawning sites disappear. The shading effect of the algae prevents sunlight penetration through the water, vital for establishing desirable plant growth. Some algae are thought to be directly toxic to animal life, too.

Exactly what are these algae we've been talking about?

Algae are simple one-celled or many-celled plants that grow in water. They may be microscopic or grow to 200 feet long (salt water kelp). They contain chlorophyll and are able to utilize carbon dioxide and sunlight to produce oxygen.

There are four groups—reds, browns, greens, and blue-greens. Some members of the blue-green group are especially obnoxious in Florida lakes.

In limited numbers, algae can be beneficial as food for other organisms, especially water fleas, which in turn are eaten by predators higher up on the food

The lake, below, is subject to runoff from the surrounding land that adds nutrients to the water. The fish kill, at right, is the most obvious result of a nutrient imbalance. A mature lake, lower right, is turning from water to land.

chain. In excess, algae can be a nuisance, discoloring and giving an unpleasant taste and odor to water. In gross amounts, algae can hasten a lake's geological extinction.

Can algae really be poisonous?

Yes, especially members of the blue-green algae group. However, conditions must be ideal—a dense algal bloom, concentrations by wind or current of huge amounts of algae, a high level of toxicity in the algae at that moment, and considerable quantities taken in by the victim. Deaths on record include horses, hogs, dogs, cats, squirrels, muskrats, rabbits, ducks, and 69 species of wild birds. So far, there have been no records of human deaths.

What is an algae bloom?

When combinations of abundant nutrients, sunlight, and stagnant water are ideal, algae increase to a visual point at which they are said to "bloom." Conversely, investigation of the nutrient content of the body of water at that moment usually reveals a low nutrient concentration, as the nutrients are being used and incorporated into the algae. But as they die and release nutrients, other algae blooms follow shortly.

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Photos By Art Hutt

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Could algae be put to work for us?

There is a school of thought that algae, under controlled conditions, could remove bacteria, nitrogen, and phosphorus from sewage more efficiently than sewage treatment plants. These algae could then be harvested and used for food and fertilizer. Domestic sewage from 10,000 people, for example, could provide up to 1,200 to 1,400 pounds of protein per day.

What is eutrophication?

This is the process by which a lake matures, ages, and dies—the geologic extinction we referred to earlier. In nature, it may take thousands of years for this to occur, but man's pollution has stepped up the process considerably. Lake Erie has aged 15,000 years in the past 50, and our own Lake Apopka has very likely equalled or surpassed this rate.

Why the words "cultural eutrophication"?

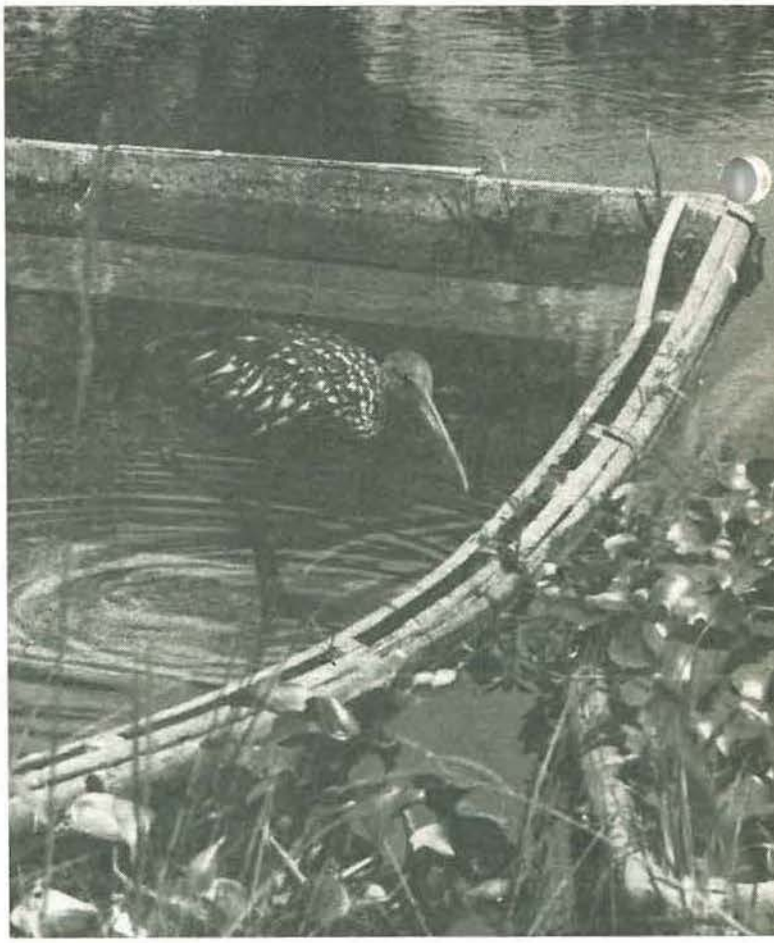
As stated, eutrophication occurs in nature even when man is not involved. But man's cultural processes result in repulsive by-products which can degrade a lake in as little as 20 years. Agricultural drainage, industrial waste, and municipal sewage are a few of man's cultural by-products. More than 1/3 of our nation's 100,000 lakes are affected. However, for whatever consolation it may be, archaeologists have discovered through core samplings of lake sediment that even the Romans were guilty of cultural eutrophication: One of their road-building projects exposed a rich limestone layer to erosion into a lake. Evidence through these core samplings told the same old story.

How can a body of water die?

In a normal situation involving a healthy lake, organisms are always dying through old age, whether they be tiny algae, large fish, or shoreline cattails. These materials sink to the bottom, and in decaying partially release their nutrients to be recycled again—and used by other algae, fish, and cattails, which will, in turn, die. Although it may have to be measured on a geological time scale, the lake fills in from the bottom up, and eventually becomes dry land. Speed the process up several hundred times over, as man has done, and a lake is hastened to a rapid death.

How does a drawdown interrupt the aging process?

Water fluctuations are extremely beneficial to a lake's well-being. They occur in nature, but man has now tried to control water levels for his own benefit, only lately realizing periodic highs and lows are part of nature's scheme in keeping a lake healthy. The lows, of course, expose much of the mucky bottom to air and sunlight. It dries, compacts, and turns into useful soil in which plants can quickly become established. In essence, you are moving the lake bottom down where it should be. Ignore the situation, and the bottom will eventually extend to the top!



How about those Lake Apopka alligator deaths last June? Algae again?

Fishkills caused by excess algal growth may have contributed to the problem, but the blame was placed on a tissue-dissolving bacteria as causing the wildlife deaths. Present in all bodies of fresh water, these bacteria, like algae, respond and increase in the presence of an overenrichment situation.

But isn't some lake enrichment necessary?

Positively. With no enrichment, a lake has a different set of problems, although not as severe or as obvious. Lack of enrichment results in a clear, aesthetically beautiful lake with very little biological productivity—an "aquatic desert." A balanced nutrient situation is ideal, of course.

How about algae in moving waters, such as rivers?

Rapidly flowing water does not promote growth and attachment of algae. This fact is frequently utilized in the "diversion" sewage system where effluent is piped around lakes and into flowing water. It is merely the lesser of two evils, however. When rivers are slowed down and developed into lakes by impoundment, as has been done quite extensively since the 1930's, algae commonly bloom and become a problem in these man-made reservoirs.

How does muck build up?

In an eutrophic lake in which billions of short-lived algae are dying daily, generation after generation of these organisms, along with other material from dead weeds, dead fish, etc., sink to the bottom where they are acted upon by bacteria of decay. This decomposition uses the oxygen in deeper water and hinders future bacterial action. The bacteria, overwhelmed by the numbers of algae masses and struggling in a low-oxygen situation, are only able to convert some, not all, of the materials into plant and animal food. The remainder builds up as layers of muck, a substrate nearly useless for supporting any form of plant and animal life.

Are weeds and fish sources of nutrients?

Nutrients are bound up in both of these organisms. Upon their death, these nutrients are returned to the lake. Weed and fish removal are frequently suggested as minor aids to nutrient reduction after the bigger sources have been eliminated. One thousand pounds of rotting fish returns 2 pounds of phosphorus and 25 pounds of nitrogen to the lake.

Is Florida unique in enrichment problems?

Florida, with mild winter temperatures, shallow lakes, and long hours of sunlight, is particularly prone to algal increases. But the problem is worldwide wherever there are masses of people living in a "modern" manner. In Switzerland, for example, when outhouses were replaced by sewage disposal plants that emptied into Lake Zurich, a complete degradation occurred in only 20 years. Riley, in his lament on "The Passing of the Backhouse," may have been an inadvertent environmentalist, for the Industrial Revolution that clumped people together in the late 1800's and the subsequent development of sewage systems has created our overenrichment problems.

Is an eutrophic lake "dead" or "dying?"

These are popular terms applied with some justice to overenriched lakes. However, a lake at this stage is actually at a peak of production, literally teeming with undesirable life forms, namely algae and trash fish.

Is eutrophication reversible?

Not in the sense that you can go all the way back to a pristine lake condition. However, scientists are confident that any body of water will respond if degrading effluents are prohibited from entering it. ●

Photos By Art Hutt

Shallow waters, mild winters, and hours of sunlight work with excess nutrients to cause the algal bloom at right. The fishing boat, above, does provide some shelter for the wildlife and fish, but when it rots and releases nutrients, it speeds the aging process of the water.

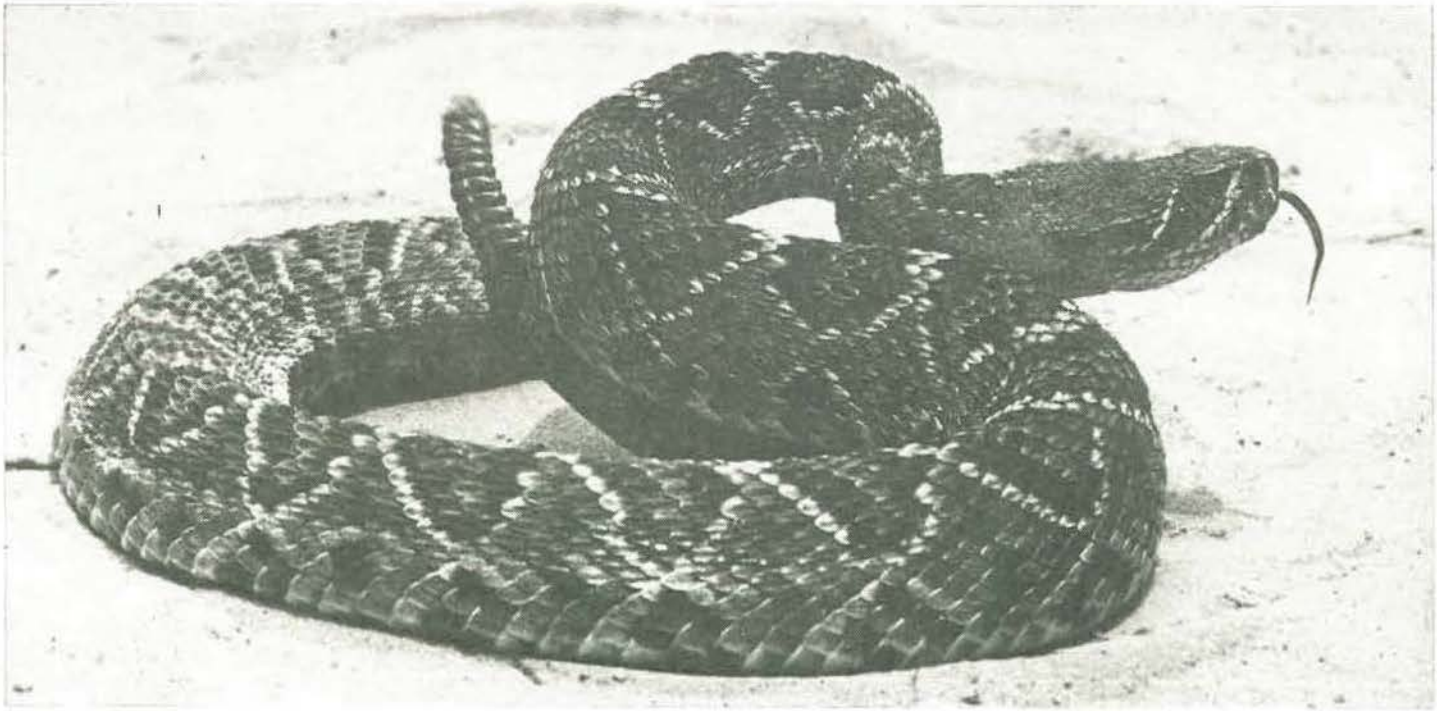


Photo By Jim Reed

— Temperature — Nature's Regulator

YOU WILL BE hearing a lot in the future about thermal pollution, the effect of man-made heat on our environment. It may be the sneakiest of all our pollutant dangers, because we are not likely to know of harmful results right away.

The widest known danger now comes from industrial plants—from heated water they dump into our streams and lakes.

It seems that one of the first things we need to know in this connection is how very sensitive animals are to temperature—the extent to which their existence is geared to it. This information should tell us how much change in environmental temperature various animals can endure without harm. Many react to extremely slight temperature changes.

The rattlesnake, for example, must head for shade at noonday. It is in danger at 100°F.—and cooked at 110°. At 65° it is hardly able to move. It survives the winter in cold climates only by hibernating. It has a real "comfort zone" of probably no more than 15°.

A bedbug will move toward an object less than two degrees warmer than the surrounding air. Other parasites, such as ticks and lice, depend on subtle heat-sensing mechanisms to find food—or change locations. Lice will leave a body suffering from fever the same way ticks and fleas will leave an animal's carcass shortly after death. The rattlesnake's well-known heat-sensing pits, which lie between the nostril and the eye, can detect on their surfaces a difference in temperature as little as .001°C.!

What is surprising investigators is how profoundly creatures are affected by such slight temperature changes.

Temperature is a great regulator of sex—but not always in the manner thought.

The prevailing idea is that come spring and warm weather, love bursts forth over the land. The opposite is more nearly the rule. Birth rather than conception gets preference of the seasons. It's the raiseing of the young that requires a long period of temperate climatic conditions, not mating.

But subtle temperature changes have a lot to do with the sex arrangement. Sperm is so extremely sensitive to heat that some male mammals are fertile only when the testicles are cooler than their body temperatures. Some animals in mountain country seek higher altitude to cool and thus revitalize themselves for mating. For temperature requirements, some animals mate only at night, or early morning or late evening, when the air is coolest.

Temperature is a factor determining the sex of frogs. At the most favorable level, half a crop of tadpoles will become male frogs and the other half, females. At high temperatures, more than 90% may be male frogs. At low temperatures, females predominate.

Nature is so complex and delicately balanced that such effects must be considered in the light of their far-reaching results. What will temperature changes do to the frog population? To those animals normally eaten by frogs? To those that prey on frogs? And to those that prey on the preyers?

Mammals and birds have virtually unchanging body temperatures compared to fishes and reptiles. If these creatures are locked into so narrow a temperature tolerance, how do they survive normal ranges of environmental heat and cold?

We don't know all the answers. We don't even know how much of a range many of them can endure. But we have observed some remarkable "ways and means" animals have for adapting to change. Some are relatively simple—entirely a matter of structure.

For example, the elephant and the desert jackrabbit have large ears—to hear better, sure, but also to help cool them. The more surface an animal has, the more heat it loses and the cooler it remains. Blood circulating through wide, thin ears is cooled much as the liquid passing through the radiator in an automobile's cooling system. (The northern jackrabbit, of cooler climes, has much smaller ears than the desert species.).

Some creatures have produced effective design and insulation to cope with heat problems.

Certain insects of the arid parts of the country have coverings of hair, or a coat of wax, that reflects the sun and reduces evaporation. Desert beetles are often more spherical in shape than their relatives of more temperate places, and some have an air-filled insulating space between the forewings and the body.

When they need more heat, some animals simply expose the largest possible area of their bodies to the sun by turning sideways. To escape heat they face the sun, exposing the minimum surface.

Some insects in cold climates use "antifreeze" in their blood as we use glycol in our car radiators. Blood of a parasite of one of the sawflies has been found to contain 20% glycerol.

Birds have complex air conditioning systems beyond the accomplishment of any human engineering. When a bird draws in breath it not only fills

(Continued on next page)

By ROSS PHARES

Photo By Wallace Hughes

The deadly Diamondback rattler, above, is severely affected by any temperature change—its "comfort zone" is only 15°. Like all birds, the Mockingbird, right, has a complex air conditioning system. During hot weather, its lungs become a bellows and force cooling air throughout various air sacs in the bird's body.

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its lungs but passes some air through a network of tiny tubules to air sacs that fill every space in its body not occupied by vital organs. The air sacs connect with many of the bird's bones, which are hollow and without marrow for this purpose. It keeps them light, and the bellows action of the lungs circulates cooling air through the bird's body as a fan forces air through the ducts of our central air conditioning systems.

It *requires* a remarkable cooling system for a bird to live. Its tremendous energy consumption and muscular action in flight creates considerable body heat. The bird has no sweat glands, and its feathers prevent loss of heat from the skin by radiation (feathers are among the world's best insulation materials, remember). To further overcome these conditions, the inner surfaces of the air sacs are moist and provide areas for internal cooling by evaporation.

Amazingly, some animals use artificial means to survive a heatwave.

When the nests of certain wasps and bees become overheated, the insects, sensing the problem, take water to the nest in their mouthparts and spray it onto the nest. Then they fan with their wings to promote rapid evaporation, thus cooling the eggs, larvae, or young!

Most adult insects die from the cold of winter. It is nature's way. But honeybees and termites may survive in cold climates by their cooperative instincts.

Inside the hive bees form into a cluster. Those in the interior start a "dance." The muscular activity creates heat. Bees on the outside form a cover that prevents rapid heat loss. The outsiders gradually rotate to the inside of the cluster and take their turn at generating and sharing the warmth of muscular heat. Such a "furnace" may maintain a temperature inside the hive 75° above that of the outside air.

Termites live in the dark, often deep in the cold, cold ground. They devise central heating by growing a fungus. How? By sprinkling the underground area with water from their bodies. Natural chemical processes of the growing fungus generate heat. It is then a matter of control to keep the termitarium at a comfortable temperature.

Few creatures have the cooperative instinct for such involved "weather conditioning," and few are so well equipped as the birds and some insects.

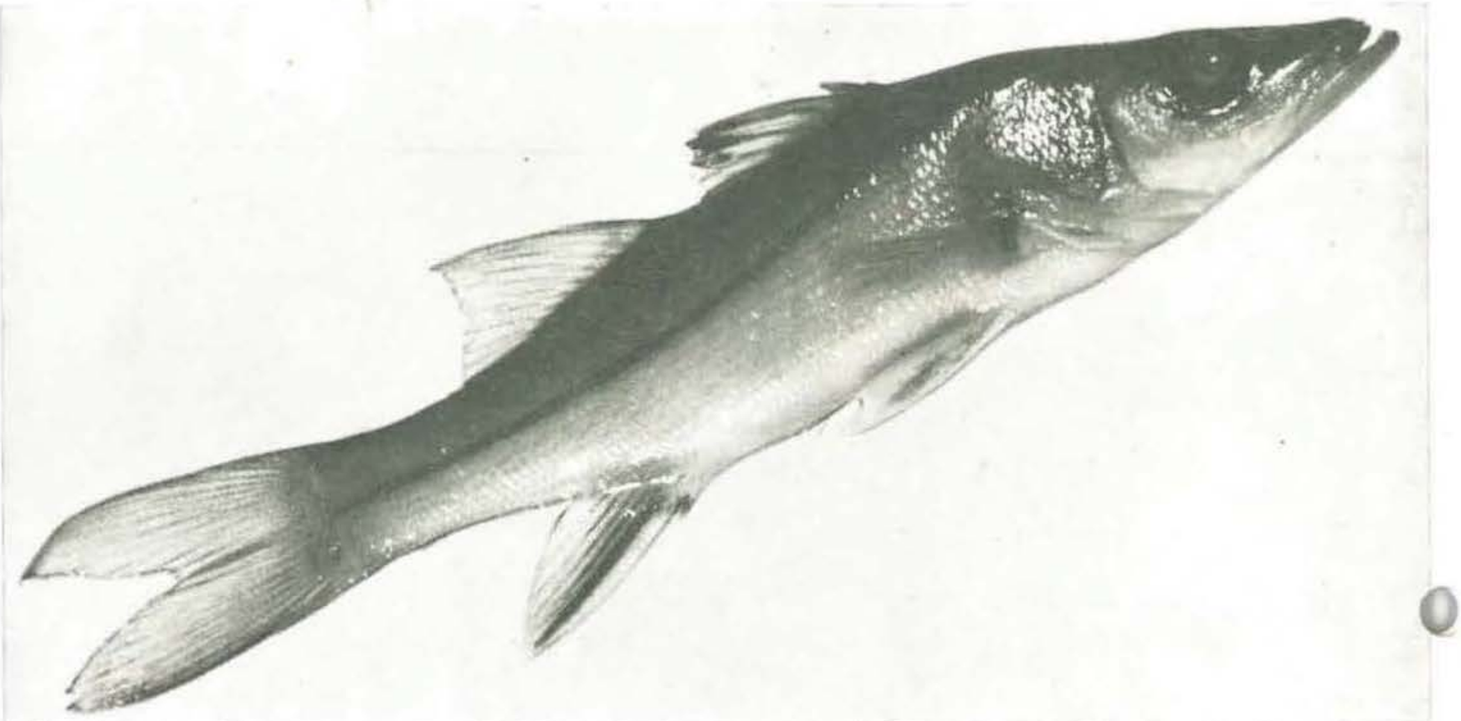
Aquatic animals are probably the least able to cope with what may be in store for them. That is why tampering with nature's water temperature ranges is hazardous business.

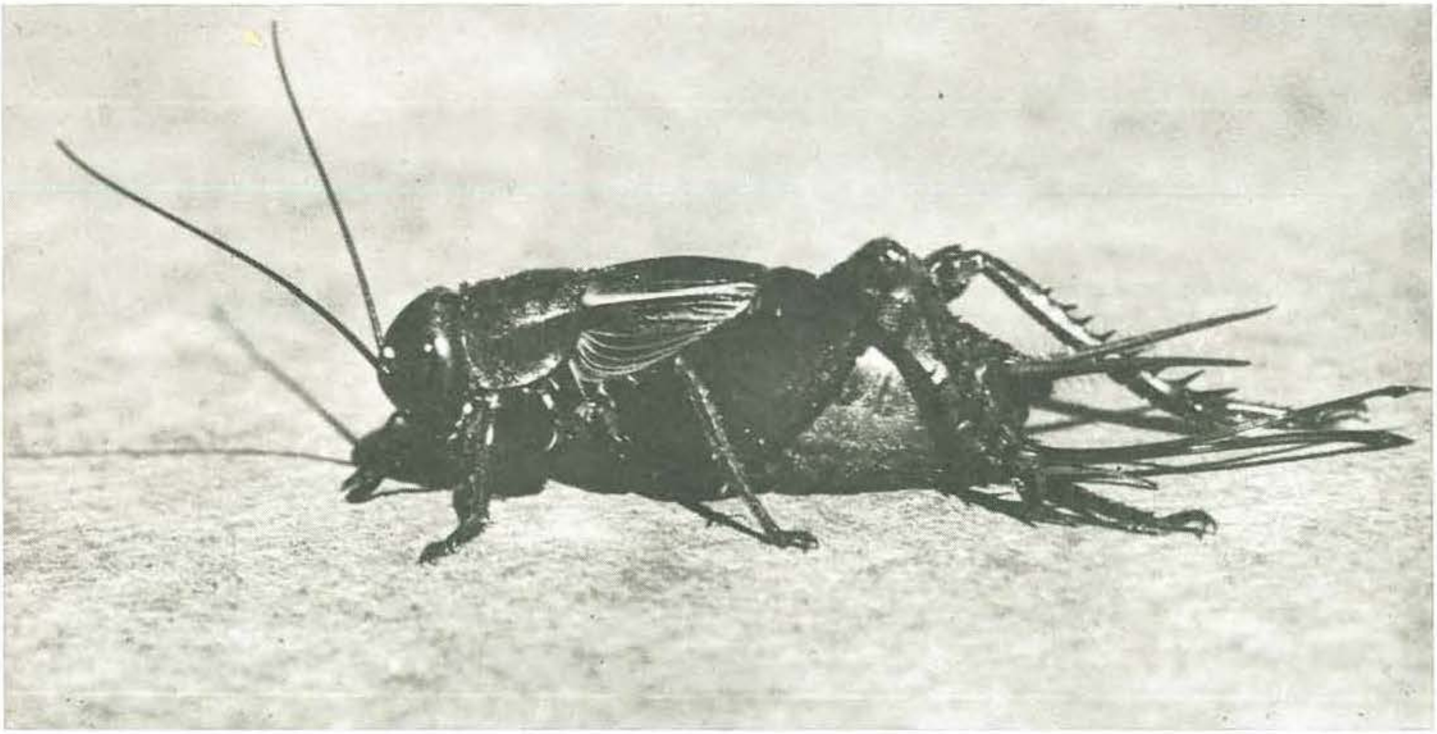
With the exception of the tuna and a very few other fishes, a fish assumes the temperature of the surrounding water. (The tuna has huge banks of powerful muscles, and their constant operation keeps the body heat well above that of the surrounding water.)

People can adjust to extremes in heat and cold by adjusting their clothing, by touching a thermostat,

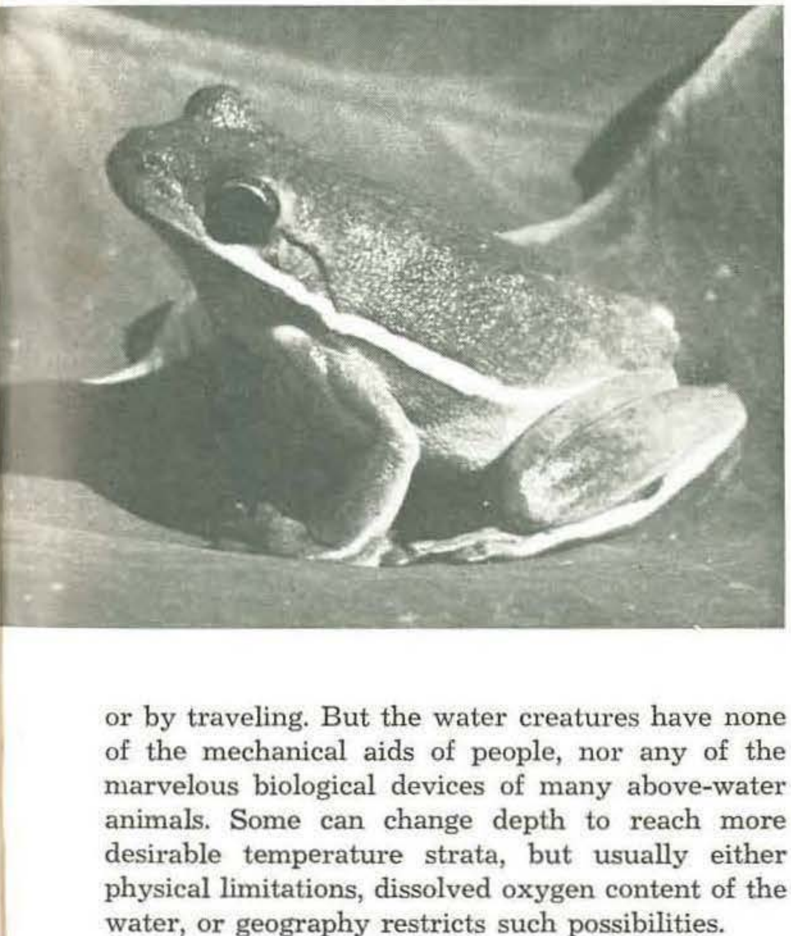
Fishes, like the young Snook, below, and most aquatics, are probably the least able to cope with much temperature change. The sex of the Green Tree Frog, right, may be determined by temperature during the mating period. The Cricket, above, is a fair thermometer: count the chirps in 15 seconds—add 40. The total should be the temperature—in degrees Fahrenheit.

Photo By Vernon Ogilvie





Photos By Wallace Hughes



or by traveling. But the water creatures have none of the mechanical aids of people, nor any of the marvelous biological devices of many above-water animals. Some can change depth to reach more desirable temperature strata, but usually either physical limitations, dissolved oxygen content of the water, or geography restricts such possibilities.

Temperature, then, is nature's regulator. It is both prodder and restrainer; clock and calendar for wild creatures. It sets them foraging and calls them to shelter or to rest. It tells many of them when to seek a mate, when to build a home, and when to start a family. It tells the hibernator when its time for the long sleep to escape the bitter cold, and it calls the aestivators to bed when they must sleep in order to survive summer's heat and droughts. It signals some migrators that it is time to head for more favorable climates.

We have all observed how active some animals are at certain temperatures and how slowed—or stopped—at others. We know that when the mercury goes down, we are safe from poisonous snakes. And in the spring when it goes up, we may be harried by busy insects.

The slightest change in temperature may produce startling effects. The female housefly is most active—and most annoying—between 90 and 91.6°F.; the male, at 93.6. The subtle influence of heat shows so obviously in cricket behavior that you can tell the temperature by its rate of chirping: Count the chirps in 15 seconds and add 40. The total is the temperature in degrees Fahrenheit.

The right temperature may be more vital for certain creatures than any other need, including the universal need for food.

Again, consider the rattlesnake. It has been known to live for two years without food, but let the temperature rise nine or 10 degrees above its narrow tolerance range and it's helpless or dead in a few minutes. (Many reptiles, fishes, and amphibians are living under similar limitations.)

Scientists are busy studying the effects of environmental temperature changes on animals—especially aquatic animals, and particularly fishes and shellfishes. Mammals and birds, as we've seen, can make some adjustments. But it may become a race between how much and how fast they can make their adjustments. And, in the case of most aquatics, it appears to be a matter of what damaging temperature changes man can—or will—prevent. ●

Seahorse Key

a dream home for two

By MAC OSCAIR

In the photo at left, Addies Folks (right) is discussing research projects with Dr. Frank Maturo. Below, Karen Folks shows two bottles from her collection—the right one is over 50 years old. Birdlife is abundant on Seahorse Key—the osprey, above right; brown pelican, center; and the white ibis all nest on island.

A WORLD WITHOUT neighbors? In Florida?

It's not impossible. Not if you're resident manager of Seahorse Key, a national wildlife refuge three miles from Cedar Key off the Levy County coast.

Addies Folks, the 29-year-old protector of the refuge, with his pretty wife Karen, lives in such a world. Their home is a 110-acre island of white ibises, ospreys, and cottonmouths. Their nearest human neighbors live at Cedar Key, a quaint fishing village in the Gulf of Mexico approximately 100 miles north of St. Petersburg.

"I suppose it's a life most people would find strange," says Addies. "There are no fast cars nor stalled traffic here. Not even a laundromat. It's a warm, uncomplicated way of life."

The young warden is accustomed to living on the refuge. He grew up on the island when his father was the warden before retiring to live at Cedar Key.

"I consider Seahorse Key my home," says the rugged looking ex-coast guardsman. "However, it's a bit of a change for Karen," he laughs. "She hails from Tampa. We met while I was working as a computer operator at the University of Florida.

Karen had never been in a boat before, much less lived on an island, so it was a big switch on her part."

With a bit of nudging from Karen, Addies added that his wife of a little over a year can now steer and dock the 32-foot Urchin by herself.

"We have to rely on each other in case of accident or illness," he notes.

With her new skill, Karen, a small, shy, black-eyed girl, does her shopping and picks up the mail in Cedar Key. She might spend a few hours chatting with her friends in the village, but by late afternoon she is steering the Urchin through the waves back toward her island home to prepare the evening meal.

The Folkses live in a lighthouse built on the island in 1855 by George Meade, who was later General of the U.S. Army of the Potomac (during the Civil War). The light itself is no longer in use —it was replaced some time back by an automatic beacon located elsewhere on the island—and the

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Photo By Wallace Hughes

Photos By Mac Oscair

At left, Addies chats with a University of Florida student who is studying amphipods on the refuge. Below, Karen walks from the lighthouse to the boat dock. Their 32-foot boat, right, brings visitors from Cedar Key to the island. Four-foot cottonmouth, below right, is also an island resident.

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lighthouse still lacks electricity. The young couple use kerosene lamps for lighting unless marine scientists are visiting the island, at which time Addies cranks up a small power generator, also used to power the island's ship-to-shore radio.

The Folkses depend on a small well and rainwater from the roof to supply their fresh water.

According to Addies, Seahorse Key is a gentle and at the same time fierce little island. In the past it has been an island of Seminoles and earlier Indians, pirates, and soldiers and sailors of the Civil War.

There is a small cemetery in the center of the island which dates from the 1800's and contains the remains of several Confederate soldiers.

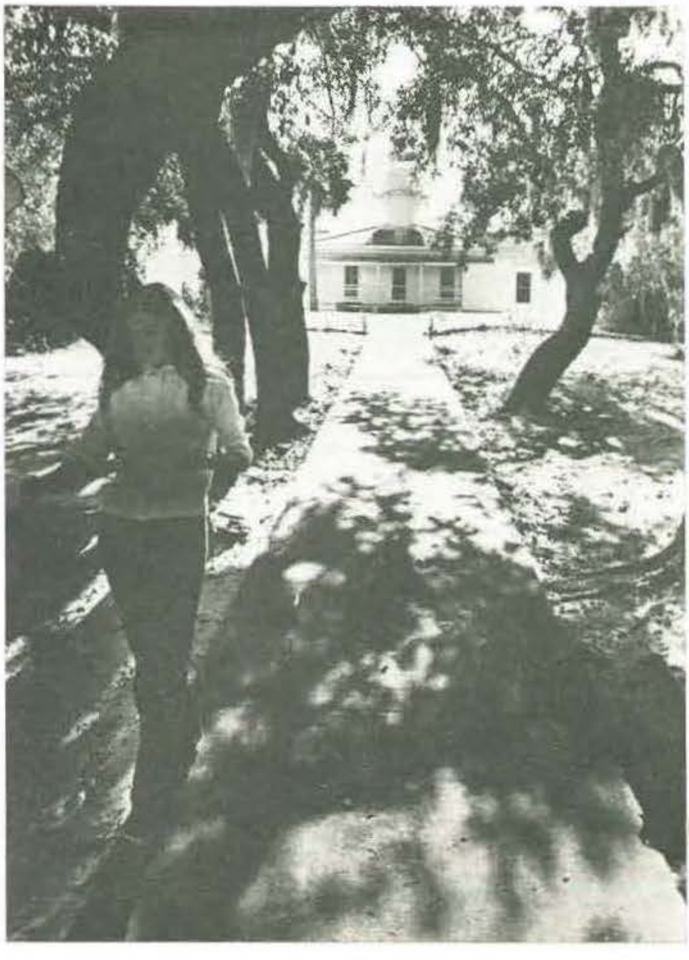
Jean Lafitte, the pirate, used the high land on the island as a lookout point, and it is rumored that a headless horseman rides the beaches of Seahorse Key on stormy nights.

Potsherds and shell middens abound from sporadic occupation in times past by the Indians. But the live oaks and cabbage palms and Spanish bayonets have long overgrown the middens. The island is once again quiet and drowsy—and the Folkses have the responsibility of keeping it that way.

Besides having a remarkable concentration of the endangered osprey—25 nests—and an unusually dense population of cottonmouth moccasins—1,100 were counted in one survey—the island is one vast rookery of white ibises at nesting time. Their sheer numbers dominate the activities on the island, and it is no longer so quiet. Over 150,000 of them use the island-rookery every year.

"The trees are simply weighed down with birds," says Karen. "They crowd every available perch and nest in every available spot. You get used to their noise after a while. Sometimes we wake up in the morning and find 300 to 400 young birds flapping around in the yard. Last spring we fed two baby ibises that had fallen out of a nest. We fed them every two hours, and they slept under the porch."

Addies explains that it is important to keep



people away from the rookeries during nesting time. Otherwise the birds might become frightened and abandon the island as a nesting site. He also points out that Seahorse Key is an important research center for scientists and students from the University of Florida.

Dr. Frank Maturo, a zoologist at the university, supervises the research in and around the island, which is truly an ideal outdoor study area. Several of his students use Seahorse as a base camp from which they can spread out into the surrounding mud flats and oyster bars. One graduate student is presently tracking the movement of stone crabs in the waters off Cedar Key—research which is important to the crab fishermen in the village.

Addies says the island's interesting past keeps creeping out of the sand. He and Karen have collected pieces of Indian pottery, arrow heads, a button from a Confederate soldier's uniform, a tiny silver locket, and even pieces of a clay pipe.

Karen has become a bit of an expert on old bottles, many of which are found on Seahorse Key. She will patiently explain age, shapes, probable origin, and similar matters relating to her bottles. She also knows a thing or two about labels, color, seams, makers' markings, and values placed on individual bottles by collectors.

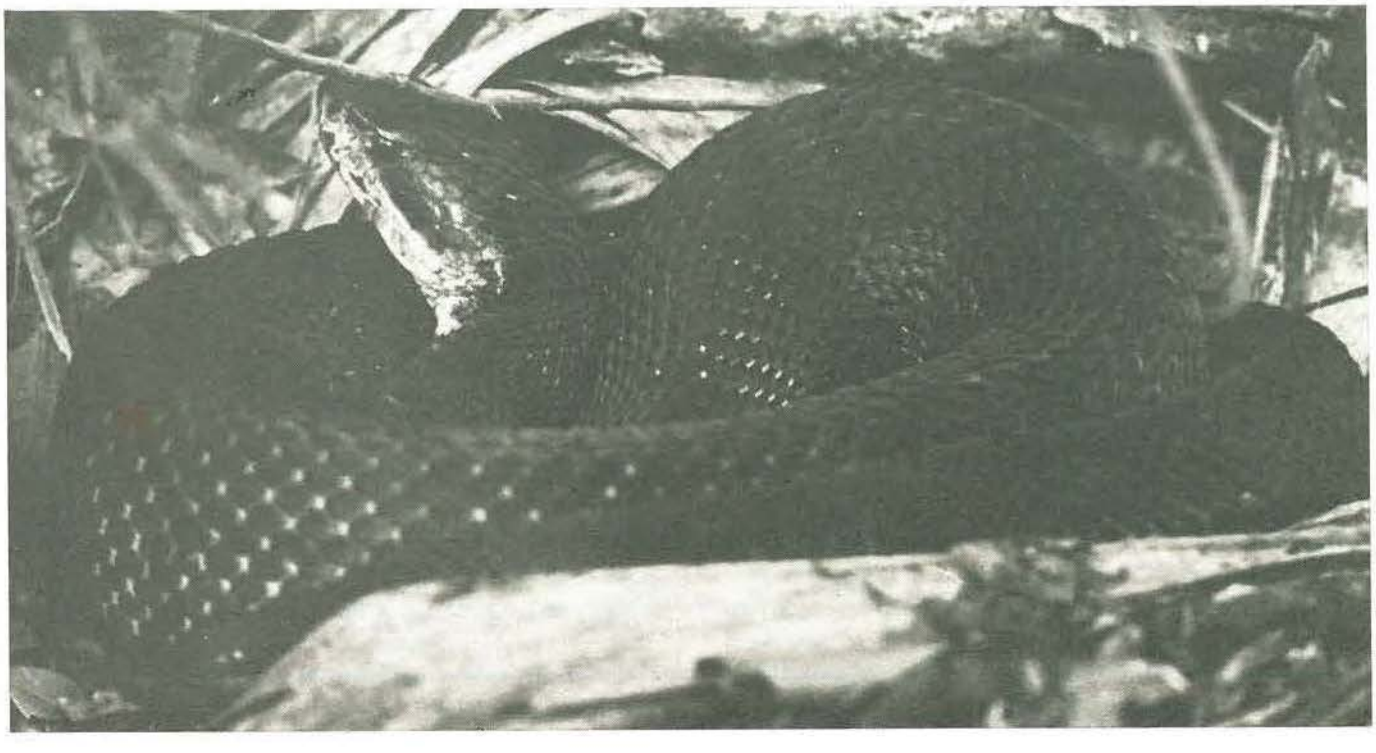
"Visitors repeatedly ask us if we ever get lonely living out here," says Addies, "but with painting the boats, mending the nets and crab pots, and takeing students out in the Urchin, not to mention looking after the refuge itself, we don't have time to get lonely."

Karen nods her head in agreement, adding in an almost reverent tone, "We like it out here." It is clear she really means it.

When evening creeps up on the little island and the mist fences it in, the Folkses light the kerosene lamps, which throw long, dancing shadows on the kitchen walls. In the soft lamplight the young warden and his wife plan the next day's work over johnnycake and coffee.

Soon it's time to retire. Another day has come and gone. Seahorse Key is just the same. Far down the beach the waves roll in and build up a little ribbon of sand. Now and then one touches the edge of an Indian midden and carries a piece of potsherd into the tide. ●

Photos By Mac Oscair



success story about bragging-size

Florida Largemouth Bass

in Southern California

By GENE SMITH

BY NOW, most Florida fishermen have heard we don't have smallmouth bass in the Sunshine State, and most of them believe it. But not everyone realizes we actually have two strains of largemouth, academically speaking: the Northern Largemouth and the Florida Largemouth. The latter, a subspecies, is the only bass found in peninsular Florida.

The differences between the two are ever so slight—the sort of things just fishery biologists and their professors are likely to spot . . . the number of rows of scales on the cheek, for example.

It is true, however, that the Florida attains greater individual weight than the Northern—in less time. One explanation for this is simply that in its subtropical home the Florida bass eats and grows almost year-round, whereas the Northern has a comparatively short "growing season," the spring and summer months. (The Northern ranges from extreme north Florida to the Great Lakes region.)

Another factor is genetics. In the thousands of years of adaptation and response to their respective home waters, the two basses have developed certain characteristics that are passed from generation to generation. One of these factors influences growth rates, longevity, etc., and makes the bass in warm southern waters grow larger than those spawned in colder climes.

It would be interesting to know whether or not the world record bigmouth, caught in south Georgia, was a Northern or a Florida—which I've never heard discussed. It just *might* have been a Florida Largemouth, since it came from an area where the two probably intergrade.

But aside from that kettle of fish, there is now reason to believe the record Florida Largemouth Bass may eventually be caught in California! If and when it happens, it might set a new world record. The background notes provide one of the best stories to come along lately in the long, hit-and-miss history of fish transplanting.

Briefly, the Florida Game and Fresh Water Fish Commission provided native largemouths at the request of California officials. Two air shipments were made to the West Coast, the first being unsuccessful. But on May 7, 1959, some 20,400 Florida Largemouth fingerlings, certified disease-free, were successfully stocked in 30-acre Upper Otay Lake, San Diego County. They survived, grew rapidly, reproduced well, and biologists have since stocked many southern California lakes and reservoirs with home-grown Florida bigmouths.

One of the researchers, Larry Bottroff of the California Fish and Game Department, wrote in a recent report, "Many of the original Floridas planted in 1959 are still with us. These 12-year-old fish have been observed to 16 lbs., 15 oz. this year. The Floridas tend to have a higher longevity than the northerns in our waters. . . ."

Northern Largemouths were also successfully introduced into bassless California—from Michigan and Vermont waters in 1874. Only a few of them were ever known to exceed eight pounds, however.

According to a story on the Florida bass transplant in the February 1970 issue of Field & Stream, the biggest largemouth ever taken in San Diego County before the introduction of the Florida fish weighed 10 pounds 3 ounces—which was a record from 1880 to 1965! In the last six years, however, the record has been reset several times and is still inching up.

An important aspect of the experiment—to West Coast fishermen especially—is the comparative contributions of both varieties to the sport fishery. This was checked out in extensive creel census studies in 1969 and 1970, when it was learned that Florida Largemouths were consistently less catchable—more of a challenge—than Northerns.

Of 700 of each kind that were marked and released in a reservoir, 43.2% of the Northerns were boated by anglers to 17.1% of the Florida subspecies. That was in '69. Another check last year showed more of the same. Of 1,000 each of marked Florida and Northern basses, plus 600 intermediates produced when the two crossbred, catch rates were 20%, 53% and 37%, respectively.

Conclusions in California: The Florida bass is heavier, hardier, harder to catch, and dominant over the Northern strain.

It seems to be a winner wherever it lives. If some California angler *does* some day set a new world record with one of those Florida bass, the least they could do is invite a delegation of Crackers to the weigh-in. ●

Hunting Litter

even the careful hunter must realize that things left in the fields and the marshes—like expended shot—may create varieties of wildlife problems

By EDMUND McLAURIN

THE PRIMARY PURPOSE of having hunting seasons is to wisely harvest some of the wild game populations to keep basic breeding stock in healthful balance with existing food supply and environment.

Given ideal habitat and adequate food, overpopulations of deer are practically assured, and under such conditions as high as 25% of some of our deer herds could be harvested annually without ill effect, biologists say.

Also, legalized hunting rarely, if ever, hurts the continental population of mourning doves. Each year—barring some natural calamity—there are as many doves as the previous year, or more. They may not be in the field you're shooting, but they're *somewhere* along the migration or wintering ranges!

Similarly, bobwhite quail make rapid population comebacks.

Dedicated, though sometimes overzealous, persons affiliated with various animal protection organizations frequently overlook these biological facts relating to game species as they define and decry hunting as "needless, cruel sport."

Granted that without hunting season harvests wild game dieoffs from malnutrition and disease would be appalling in some parts of Florida, what are the postseason effects of hunting? Long after sportsmen have racked their guns and begun planning toward the next season, do expended lead shot, empty shell and cartridge casings, discarded plastic products, and other man-created trash exert any effect on wildlife?

In some cases, yes.

Sportsmen who take along their handy, self-developing cameras on outdoor excursions frequently discard the peeled-off portions of their filmpacks without so much as a blink, probably thinking only of the finished photo they've just made. These discarded film papers contain chemicals that can poison wildlife.

This hazard is authenticated by case histories kept by game biologists, veterinarians, and especially by national park service rangers out west.

In one of the larger national parks, an estimated 00 moose, deer, and elk alone died from eating self-developing film papers last year. Other species of wildlife were also affected, and many were fatalities.

If wild and domestic animals will eat discarded film papers, will they also consume empty plastic shotgun shells? Do cows, pigs, and horses sometimes eat the polyethylene shell casings left in dove fields, quail hollows, and squirrel and deer woods?

Neither question can be answered "yes" or "no." Many factors are involved.

It is logical to conclude that a few wild and domestic animals will run across empties and chew them. Some of the cases, we might assume, will be swallowed. On these points there is not much argument. But on the *effects* of such, there is wide difference of opinion.

Many stockmen stoutly contend that plastic shotgun shell casings are poisonous to livestock. Texas cattlemen raised such a fuss about the danger of empty plastic shells to cattle that two of the nation's largest ammunition makers sponsored scientific tests.

Not only were specific ranchlands chosen for field study by investigating veterinarians, but along with observation of feeding livestock, efforts were made to have test animals pick up empty shells voluntarily. Not an animal showed any interest in munching or swallowing a single shell case!

Then the researchers tried force-feeding. In most cases, the test animals promptly regurgitated the casings. The few that didn't showed no detectable ill effects, continuing healthy and completely normal lives.

Meanwhile, chemists at the Squibb medical research laboratory were conducting their own experiments. Chemical analysis failed to show any toxic properties in plastic shotshell casings. Also, like the veterinarians, they were unable to induce any feeding livestock to voluntarily pick up and swallow either a plastic shell case or an empty brass cartridge case. Experimental force-feeding gave the same results the vets got. Most of the animals quickly expelled the foreign objects, and there was no toxic effect among the few that kept them down.

The only conclusion the Squibb chemists could reach relative to a few of the animals accepting force-fed shell casings was that they were already suffering from phosphorus deficiencies. Where

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such a condition exists, it is not uncommon for an animal, especially a cow, to take foreign objects into the stomach in attempting to alleviate the dietary deficiency.

A veterinarian friend who lives in Florida cattle country told me he has found all sorts of items in the stomachs of autopsied cattle—rocks, pieces of barbed wire, cloth, bottle caps, beer can tops, and other items—but never any discarded shotshells or cartridge cases. He added, however, that he feels cows might sometimes swallow such in view of their obvious lack of selectivity when picking up foreign objects.

Another friend who annually butchers cattle for the market told of occasionally finding bits of metal but never a shell or cartridge case—and during dove season his grazing fields are heavily hunted and hundreds of empty shells are left lying about.

The subject came up again when I chanced to meet two veterinarians at a rural grocery store in the Ocala National Forest. Over cooling midday drinks we got acquainted.

One vet said he had once been associated with a large meat packing plant and had the opportunity of making many livestock stomach examinations. He said a few empty shotshells were found, but, like other foreign objects commonly swallowed and retained by grazing livestock, no harm had resulted. He did not know of a single instance of a cow or horse becoming sick or dying from ingesting an empty shell case, plastic or otherwise.

According to the medical research chemists at Squibb, whose test report appeared in a trade magazine, the plastic now used to make shotgun shell casings is an inert substance—one without toxic effect on either animals or humans. In fact, they pointed out that the same material is often used in softer form to construct replacement heart valves and arteries for implantation in humans.

Plastic bags, beverage can pull tabs, plastic beverage can binders, and empty cans have all reportedly caused trouble for various animals at times. These plus the film papers are unsightly and dangerous enough in themselves, but there is a far more serious problem—for waterfowl. It is the documented effect of postseason intake of expended lead shot by feeding ducks.

Surveys by game commissions show that only 7% of the total annual hunter population are waterfowl hunters—yet each season these hunters scatter an estimated minimum of 6,000 tons of lead shot over waterfowl feeding areas. In some of our more heavily hunted sections, where seasonal waterfowl and hunter concentrations have coincided, accumulating shot deposits now literally blanket wetland bottoms.

Feeding waterfowl—particularly shallow water bottom feeders—pick up some of this expended shot. This is equally true of Florida, as along the Mississippi flyway.

The lead shot intake plays havoc with waterfowl digestive systems, introducing starvation and lead poisoning dieoff.

Field studies by game biologists indicate that almost 25% of the North American mallard population alone consume expended lead shot, and that at least 4% of these birds die from lead poisoning. Other species of similar feeding habits, of course, are also affected.

Much depends on the nature of the wetland bottoms on which expended shot settle. In very soft bottom ooze, the lead shot will often sink to a depth beyond the reach of feeding ducks. Also, shot that fall in marshes having tidal flow and a high rate of siltation generally do no harm.

On some types of shallow water bottoms, however, the shot tend to stay close enough to the surface to be ingested by dabbling ducks sifting bottom ooze for seeds. Worse still, some of these areas have been accumulating durable lead shot for years and years. Like other forms of man-introduced pollution of woods and wetlands, the growing problem has suddenly come to a serious stage.

A simple solution, it would seem, would be to substitute a harmless metal for lead in shot manufacture.

It is easier said than done.

For years, members of the Sporting Arms and Ammunition Manufacturers' Institute fruitlessly conducted research to find either a suitable modification or a substitute for lead shot. No go!

Eventually, the trade members of SAAMI called on Illinois Institute of Technology Research to conduct independent experiments. Findings have been interesting and encouraging, but not truly practical of application.

The problem is to find another metal as ideally suited to shot-making as lead. The soft metal has desirable sectional density, molds readily, has long shelf life, and is relatively cheap compared to more expensive metals like nickel and copper. It can be said that lead was seemingly intended for its job in sporting ammunition making and ballistic performance.

Initially, the researchers tried various metal and plastic coatings for the already ballistically efficient lead shot. What seemed good theory failed. The strong, grinding action of a duck's gizzard abrades even the hardest protective coatings and ultimately exposes the bird's digestive system to the lead cores! Other avenues of exploration were chosen.

Attempts to completely substitute glass, plastic and certain other metals for lead failed, primarily due to their lack of suitable sectional density and the resulting poor ballistic performance.

Steel shot failed miserably. Simply, even our so-called "soft," heavily alloyed steels are too hard for adaptation to shotgun shell pellets. Even when coated with softer metals, experimentally manufactured steel shot tended to score the inside of shotgun barrels through which repeated test loads were fired.

Then someone hit on a fresh approach: Why not try iron shot for waterfowl ammunition? Discharged over wetlands, iron shot would quite likely rust and disintegrate fast.

The idea seemed a logical one, but there were serious associated problems here, too.

Tests proved iron shot hard on shotgun barrels, quickly causing barrel erosion and choke damage.

A shotgun's ability to produce a consistent and effective pattern is diminished after firing relatively few rounds of iron shot loads.

Also, it was found that iron shot in unfired shotshells hardens with age, and that even modest use of hard iron shot pellets will damage barrel choke.

All sorts of plastic cups and casings were experimentally tried, in an effort to keep fired shot loads from contacting and damaging the insides of shotgun barrels. No dice!

Despite cups or collars around the iron shot, there still was considerable harmful peening action against the shotgun barrel's interior surfaces. Resulting scratches or scoring were plainly visible in some of the test barrels, plus dimensional metal damage at the barrel's forcing cone.

Why not use really *soft* iron shot?

The idea was tried and found to work to an encouraging degree. At first, shot patterns proved sufficiently tight and uniform over ranges under 50 yards, and the initial test of *soft* iron shot showed no discernible barrel scoring or choke damage. Seemingly, a practical solution had been found.

Continuing firing tests proved more disappointing, however. Use of soft iron shot loads in various makes and models of shotguns soon revealed some of the same problems caused by ordinary iron shot—barrel scoring, choke deformation, and barrel forcing cone changes.

Also, the shotshell makers are not fully convinced that iron shot are *safe* to shoot over the average working gun life, which use of iron shot would markedly shorten. Unless further improved, use of iron shot could mean shotgun barrel life of only 200 to a thousand rounds before serious effect.

If shortened shotgun barrel life and gradually declining choke performance and patterning ability of favorite shotgun are acceptable to waterfowlers, then market production of soft iron shot loads will likely soon be made.

Eventual retail cost of soft iron shot loads is another influencing factor of acceptance. Conceivably, the retail selling price of soft iron-loaded shotshells might be higher than conventional lead shot loadings.

There is also a raw material problem.

Super-soft iron wire is needed to manufacture iron shot. Currently, there is no market source able to deliver the quantity of wire needed by the ammunition makers.

Also, each delivered lot of soft-iron wire from which the shot is formed must meet ballistic laboratory specifications. Repeated production to set standards is not easy when producing soft iron. Further, processing is a manufacturing work stage that ammunition companies prefer to have done outside their plants.

Productionwise, officials of the Superior Steel Ball Company, of New Britain, Connecticut, are optimistic. They state they can produce soft iron shot that will not harden with age and, given about 20 weeks to get started, can eventually produce up to 20,000 pounds of non-toxic shot a day. MPB Corporation, of Keene, New Hampshire, feels it could provide a reliable supply of soft iron shot on contract.

Both firms have ideal geographical locations, being close to large ammunition-producing factories at New Haven and Bridgeport. Delivery of manufactured iron shot to these plants—a factor in ultimate consumer price—would not entail long haul transportation charges.

Aside from harmful effects on the gun, what can be said of the performance of waterfowl loads containing *soft* iron shot?

Field tests have indicated that shotshells loaded with 1 ounce of No. 4 soft iron shot have almost identical "killing effectiveness" as comparable lead shot loads, if applicable range of 50 yards is not exceeded. In terms of shot-crippled birds, the tests indicated no appreciable difference between experimental iron shot and lead loads.

In some states, legislation has been introduced in an attempt to force shotshell manufacturers to a faster research and marketable product by pointedly making use of lead shot loads objectionably costly to the consumer.

During the last session of the Florida Legislature, a bill was introduced that would have placed a special tax of approximately 8¢ per shotshell on those containing conventional lead shot. The bill was withdrawn when leading sportsmen's organizations combined to point out both the bill's untimeliness—since, so far, there is no marketable substitute product for lead-loaded shot shells—and the heavy financial burden on consumers.

Of course, there will eventually be a practical, permanent solution to the problem, we hope. Time is of the essence, however, and the brilliant shooter, metallurgist, or ballistician who can suggest a truly satisfactory substitute for lead shot will, no doubt, have his likeness cast in bronze. ●

CONSERVATION SCENE

New Fishing Book

THE INTERIOR Department's Fish and Wildlife Service has announced publication of SPORT FISHING U.S.A., a new blockbuster fishing volume compiled by 43 well-known writers and scientists.

The book offers solid information on fish migration, feeding, breeding, physiology, and current fish management programs. It also discusses angling pressures, new water uses, introduction of exotic fishes, and underwater environmental changes by pollution. Fishing experiences, equipment, techniques, and angling history are treated in separate chapters; and the authors pull no punches in their frank appraisal of "things we must do" if fishing is to remain a part of us.

"It is fitting," says Interior Secretary Rogers C. B. Morton in the book's foreword, "that we mark the centennial year of Federal efforts to conserve our fishery resources with publication of a book about the fun and frustrations, mysteries and rewards of sport fishing. For truly, fishing is the great American outdoor sport, luring millions of us with the wholesome beckoning of ocean, lake and stream."

SPORT FISHING U.S.A. features 21 color paintings by Bob Hines along with a host of photographs. You can obtain a copy by sending $10 to the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Wildlife Funds

STATE FISH and game departments have received federal funds totalling more than $26 million for fish and wildlife restoration and hunter safety programs, according to the National Wildlife Federation.

Wildlife restoration efforts cornered $18.5 million of the lump sum; fish restoration $5.6 million; and $2.5 million was pumped into hunter safety programs. The hunter safety money became available with 1970 legislative amendments to the Federal aid for wildlife restoration program. The funds are drawn from Federal handgun excise taxes which are shuffled from the Treasury Department to the Interior Department's Bureau of Sport Fisheries and Wildlife. The safety money, which may be used for construction, operation and maintenance of public outdoor target ranges, is distributed according to State population.

Wildlife restoration funds are used mainly for land acquisition, development, and research—all designed to improve game species management. The money is dished-out according to a State's relative area, and the number of licensed hunters in the State. Fish restoration funds may be used for land and water acquisitions, research, construction and rehabilitation of lakes, and development of access sites and fishermen facilities.

Federal financing of these state projects may cover up to 75 percent of program costs. Further funding for all three programs will be made later this year.

Ob-Scene of the Month

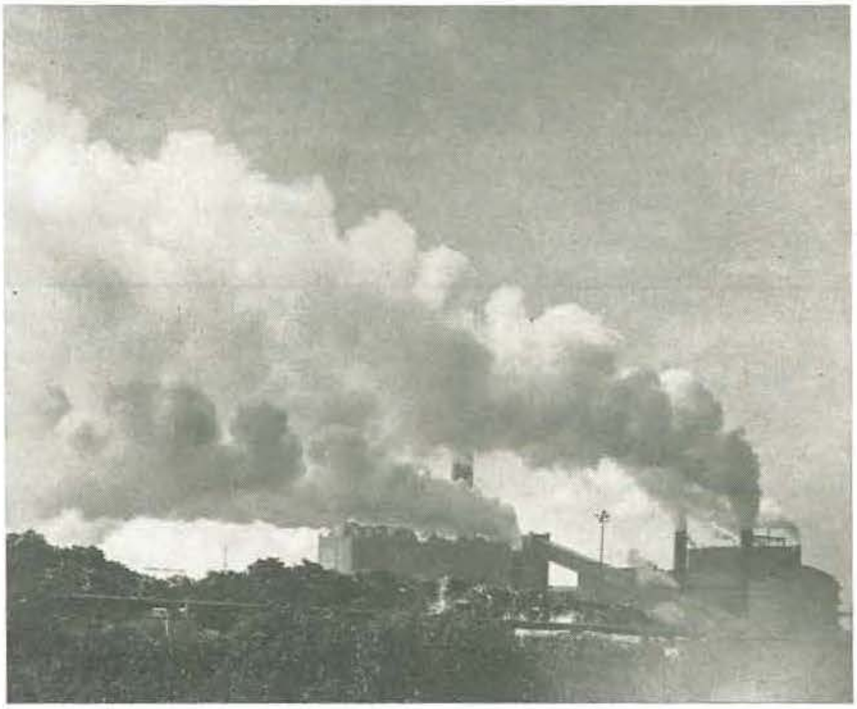

Photo By Lovett Williams

"Oh, say can you see . . ."
or breathe?

For that BIG ONE that didn't get away

ELIGIBILITY REQUIREMENTS
SPECIES

LARGEMOUTH BASS	8 pounds or larger
CHAIN PICKEREL	4 pounds or larger
BLUEGILL (BREAM)	1½ pounds or larger
SHELLCRACKER	2 pounds or larger
BLACK CRAPPIE	2 pounds or larger
RED BREAST	1 pound or larger

All fish must be taken from the fresh waters of the state of Florida, as defined by the Game and Fresh Water Fish Commission. Fish must be caught on conventional fishing tackle, with artificial or live bait, in the presence of at least one witness.

The catch must be weighed and recorded a fishing camp or tackle store within the state by the owner, manager, or an authorized agent of the respective establishment.

FLORIDA WILDLIFE'S
FISHING CITATION

is available without charge, to any and all subscribers to Florida Wildlife Magazine, and their immediate families, who catch any of the fresh-water game fish of the prescribed species and size requirements. Citation, showing recorded date of the catch, will be mailed to the applicant upon receipt of the following application form that has been properly filled out and signed.

Only fishing citation applications received within 90 days from date of catch will be honored.

APPLICATION FOR FLORIDA WILDLIFE FISHING CITATION

The Editor, FLORIDA WILDLIFE Date________
Game & Fresh Water Fish Commission, Tallahassee, Fla.

Please send me the Florida Wildlife Fishing Citation with the inscribed data listed below:

Name (please print)________

Address ________

City________ State________ Zip No.________

Species________ Weight________ Length________

Type of Tackle________

Bait or Lure Used________

Where Caught________ in________ County

Date Caught________ Catch Witnessed By________

Registered, Weighed By________ At________

Signature of Applicant________

CUT OUT AND SAVE THIS APPLICATION BLANK

Mourning Dove Photo By Wallace Hughes

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512 E. LOWELL ST
LAKELAND, FLA. 33801

FLORIDA WILDLIFE Magazine
Game & Fresh Water Fish Commission
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